THE

Queensland Naturalist.

THE ORGAN OF THE FIELD NATURALISTS' CLUB
AND ITS BRANCHES

VOL. I. MARCH 31, 1908. No. 1.

Field Naturalists' Club.

REPORT OF COMMITTEE FOR 1907.*

Your Committee has much pleasure in presenting the Second Annual Report.

The following office-bearers were elected at the Annual Meeting, held on 25th January, 1907, viz. :—President, Henry Tryon ; Vice-President, J. Shirley, B.Sc.; Committee, A. Exley, George Gross, E. A. Hurworth, Jas. Johnston, and S. B. J. Skertchly ; Hon. Secretary and Treasurer, C. W. Holland ; Hon. Excursion Secretary, G. Caldwell.

Mr. Caldwell was unfortunately prevented from acting in the capacity of Excursion Secretary, and his place was taken by Mr. W. T. Woolley, but he also was, later in the year, compelled to relinquish the post. The responsible duties of this office, under these circumstances, devolved on the Hon. Secretary.

An alteration of the Rules providing for the addition of the Immediate Past President and two extra members to the Committee has been made. In accordance with this alteration, two ladies (Miss A. Hardgrove and Miss D. Sutton) were appointed to the Committee at the end of October, after having been nominated for the position by a general meeting of lady members.

Eight meetings of the Committee were held, and the attendances were as follows :—Mr. Tryon, 8 ; Mr. Shirley, 7 ; Mr. Gross, 7 ; Mr. Skertchly, 7 ; Mr. Hurworth, 6 ; Mr. Johnston, 5 ; Mr. Exley, 4 ; Mr. Woolley, 3 ; Miss Hardgrove, 1 ; Miss Sutton, 1 ; Mr. Caldwell, 1.

There were on the books of the Club at the beginning of the year 107 members ; 14 have left Brisbane or resigned ; and 30 have been elected.

The evening meetings numbered twelve, the average attendance at which was 24. Many interesting exhibits and papers were brought forward at these meetings, and the

* Read at Annual Meeting on 31st January, 1908.

Club has every reason to congratulate itslf on the excellence of their nature. It is therefore a matter of regret that during the period covered by this report there has been no publication for recording proceedings.

One special meeting, attended by 22 members, was also held for the purpose of amending the Rules as above stated.

Thirteen excursions were held, and they were all well attended. In this connection an advance was made on the previous year's programme by the inauguration of extended excursions for three or four days, when suitable holidays presented themselves, and visits were paid in this way to Buderim Mountain, Gympie and Toowoomba. At the two latter places opportunity was taken to urge the formation of local branches of our Club. The success of these extended excursions was largely due to the kindness and foresight of the local residents.

The following is a list of the field meetings :—White's Hill and Pine Mountain ; Goodna and Woogaroo Scrub (whole day) ; Buderim Mountain ; Northgate Junction and Nudgee ; Gympie ; St. John's Wood and Taylor's Range ; Mount Coot-tha ; Oxley—Darra ; Toorak ; Mt. Gravatt ; Sunnybank ; Toowoomba ; and Tweed Heads.

The Presidents and Secretaries of the various scientific societies in Brisbane were accorded the privilege of attending the Club's meetings, and some of them took advantage of the offer.

With a view of bringing the Club's influence to bear on the promotion of the Nature Study movement in edueation among school children, a circular was sent in October to 76 Brisbane and suburban schools, both public and private, suggesting the holding of excursions for senior students, and offering to depute a member to attend and assist in the study of the particlar branch of Natural History taken up on the several occasions. A number of replies favourable to the project were received, and two successful excursions have already been held. But for the advent of the Christmas holidays, others would have taken place. It is expected that the Club's offer, which has been generally commended, will be availed of to a large extent during 1908.

Your Committee has projected the issue of a quarterly journal with the title of "The Queensland Naturalist, the Organ of the Field Naturalists' Club and its Branches," for the publication of reports of meetings (including reproduction of the papers read), field exeursions, and other suitable matter. The proposed Journal would be an interesting and useful record of special observations and inquiries eoncerning the Natural History of the State. It would also serve as an exchange for the publications of kindred Clubs and Societies, and so assist in the formation of a Reference Library. A eireular was recently addressed

to members inviting subscriptions thereto, and a considerable number have already pledged themselves to support the undertaking. Before a commencement can be made, however, further support will be required.

The Field Naturalists' Clubs of the other Australian States were informed that their duly accredited members visiting Queensland would be accorded all the privileges of membership, except that of voting, during their stay. As the outcome of this arrangement, several distinguished Southern naturalists have attended both our indoor and field meetings.

Appended is a Balance Sheet, showing that on 31st December last, the Club had a credit of £8 17s. 5d.

HENRY TRYON, *President.*
C. W. HOLLAND. *Hon. Sec.*

17th January, 1908.

Statement of Receipts and Expenditure for Twelve Months Ending 31st December, 1907.

RECEIPTS.	£	s.	d.
To Balance from 1906	1	7	10
,, Subscriptions..			
73 at 5s.	18	5	0
1 at 20s.	1	0	0
3 at 10s.	1	10	0
	20	15	0
	£22	2	10

EXPENDITURE.	£	s.	d.
By Printing ..	3	15	0
,, Postage ..	3	10	8
,, Rent Technical College ..	2	15	0
,, Telegrams	0	12	9
,, Cash Box ..	0	7	6
,, Advertising	0	11	6
,, Rubber Stamp	0	3	6
,, White's Hill Excursion ..	0	3	6
,, Gympie Excursion ..	0	5	3
,, Toowoomba Excursion ..	0	8	1
,, Stationery ..	0	2	8
,, *Q.E.J.*—lighting	0	10	6
,, Balance in hand ..	8	17	5
	£22	2	10

C. W. HOLLAND,
Hon. Sec. and Treas.

Examined and found correct,
A. E. JONES, A.I.A.Q.,
Hon. Auditor.

LINNÆUS AND BUFFON.*

1907 BICENTENARY OF THEIR BIRTH, 1707.

BY HENRY TRYON.

Although the remarks on my part that have been the outcome of my election to this Presidential chair—an honour of which I have been ever sensible—have already from time to time made great demands on your forbearance. I am reminded by my colleagues on the Committee of the Club, that I cannot vacate it without delivering the annual address that precedent has ordained.

As the Annual Report of the Council will have already given you a resume of our work during 1907, I need not further dwell on this topic ; especially, since the degree of advancement in the carrying-out of our *raison d être* that it reflects, is not such as one can regard with much satisfaction.

Fortunately, it is not my lot to have to chronicle any of these sad events, that often fall to the lot of a President of a Club to touch upon on an occasion like this I shall therefore strike out on a somewhat unusual course, and allude to joyful happenings of an opposite character. I find however, that I shall have to go further back than the year of my Presidency in order to indulge in this theme

Two hundred years prior to 1907 were born two men, one a native of Sweden, the other a Frenchman, whose coming upon the scene were epoch-making events for the sciences we especially cultivate. These by name were George Louis le Clerc Comte de *Buffon* and Karl Von Linné, usually spoken of under his Latin designation—*Linnæus*.

BUFFON.

Buffon, the earlier, is best known as being the author of *Histoire Naturelle Générale et Particulière* (1741-67), a very voluminous illustrated work on natural history, affording access to a vast amount of information from various sources, not omitting the results of his own observations concerning animals of all classes, and even extending to the consideration of inorganic objects. This history comprised fifteen volumes relating to mammals, and in dealing with these Buffon had the co-operation of Daubenton, whose anatomical drawings illustrated the subject ; nine volumes relating to birds, two to reptiles, five to fish, in which Lacepede was his coadjutor, five to minerals, and seven supplementary to the whole. His position of Director of Le Jardin de Roi, now known as Le Jardin de Plantes, Paris, was of material aid to Buffon in the preparation of this monumental undertaking. The work, occupying these many superb quartos, not only—for the most

*Presidential Address at Annual Meeting of Field Naturalists' Club, Jan. 31, 1908.

part—appeared in more than one edition, but was also issued in an abridged form both in France and England, and had—it is affirmed—a most powerful effect in stimulating a love of nature.

The Manuel du Naturaliste, that he wrote in 1771, a *vade mecum* occupying two small volumes, exerted a like tendency. Both these proclaimed Buffon to be a descriptive naturalist of a very high order.

But, in addition to being a descriptive naturalist, paying great attention to each animal species and its structure, this French savant manifested special aptitude for sagacious speculation, anticipating thus the conclusions of a later age.

Taine (*cf.* Les Origines de la France Contemporaine—The Ancient Regime, 1876), coupling his name with that of a famous successor in zoological inquiries, in alluding to his achievements in this field, sums up his contributions to the philosophy of nature, as the outcome of this effort of pure reason, in words as follows :—

"Buffon already and especially Lamarck, in their great and incomplete sketches, outline with penetrating divination the leading features of modern physiology and zoology" . . . . and thus concludes his proposition : "In the picture which the human mind draws of nature, the general outline is marked by the science of the eighteenth century, the arrangement of its plan and of the principal masses being so correctly marked, that to-day the leading lines remain intact, With the exception of a few partial corrections, we have nothing to efface."—*Op. cit.*, p. 173.

This position accorded to Buffon, and that almost all succeeding naturalists have failed to acknowledge, received —it may be here pointed out—worthy recognition at the hands of St. G. Mivart, at the 1879 meeting of the British Association for the Advancement of Science, in his Presidential Address before the Section of Biology.

These general views of nature on the part of Buffon, find expression in his great work, *Le Histoire Naturelle*, but they are to be especially met with in his "Theorie de la Terre" (1749), and his "Epoques de la Nature" (1788), marking the two extremes of his literary activity.

They are, however, too extensive to be treated of on the present occasion, but amongst important features that they relate to, may be mentioned the following ones :— (1) the history of the earth, from its molten condition to the dawn of life thereon ; (2) the origin of animal species (Buffon took up the position that all animals originated from a small number of primary forms) ; (3) Animal variation and specific change (in which he recognised as casual agents : (*a*) migration with isolation (*b*) direct action of external conditions—including alterations of aliment and

temperature (*c*) degradation, and (*d*) a living individualizing principle manifested in every animal and synthesising its varied activities); (4) man's place in nature, superiority in this respect to the animal, and in what his high rank consisted.—(*Vid.* Mivart, *Op. cit.*)

Apart from his merit as a naturalist, he was especially celebrated for his literary style. The editor of the *Bibliotheque des Ecrivains Francois* thus alludes to it in referring to his natural history:—"It is one of the most beautiful literary monuments that exist in any nation. What nobility, elevation, purity and elegance of style! What brilliancy, what fire, what justness in his images! What beauty, what truth, what naturalness in his pictures! with his pen all is embellished, and seems to receive new life (*Transl.*), etc., etc. His tableaux relating to celebrated compatriots will be found to bear out the truth of this contention. That of the great naturalist-traveller, La Condamine, should have an interest for us.

He was an intimate of Louis XV., and the members of his court. Born at Bourgoyne in 1707; he died at Paris in 1788."

LINNÆUS.

Karl von Linnè (or Linnæus), as one of a wider and more enduring fame, must receive more extended notice at my hands. He was the son of Nils Linnæus; born at Rashult, in Sweden, on 13th May (Swedish style), *i.e.*, 23 May (new style), 1707; his father being a Pastor of that place. Such has been the outcome of this event that the bicentenary of his birth was celebrated during May, 1907, in widely separated countries; but, especially, at Upsala, in his native land, under the joint auspices of its University —in which he had held the first chair of Botany—and the Royal Swedish Academy of Sciences of Stockholm, of which he was a founder; these bodies in their separate capacity issuing invitations to the ends of the earth, that homage might be paid to his memory. An interesting feature of the great gathering was the presentation of a special Linnean Medal that had been struck for the occasion, and that was granted by Sweden to the great British botanist, Sir Joseph Hooker. But the bicentenary of the great man's birthday was honoured independently by bodies of scientific men in many other countries also. On the 23rd May, 1907, the Linnean Society of New South Wales held a special session for the purpose, at which the merits of Linnæus were extolled from several different points of view by special speakers. The wave of interest in Linnæus that the event alluded to gave origin to does not appear, however, to have been felt in Queensland.

To quote the *Gardener's Chronicle*, of 25 May, 1907, "Linnæus, or, as he was afterwards called, Carl Von Linné, showed from early childhood a great interest in plant and insect life, much to the disappointment of his father, who wanted his son to take up theological studies. Linné followed his own inclinations, and went to the University Lund, where, under great privations, he studied for some time, afterwards going to Upsala, where at the expiration of two years, he was appointed Lecturer in Botany."

From this source of information, we may also gather a list of Linnæus' publications (which is a very defective one, however, omitting many titles), and other particulars.

His life work may be alluded under various headings as follows :—

The Linnean System of Naming Animals and Plants.

An International Congress that met in Vienna, in 1905, adopted, as the 1st Rule of Botanical Nomenclature, the following one :—"Natural history can make no progress without a regular system of nomenclature which is recognised and used by the great majority of naturalists of all countries."

Previous to Linnæus, the different living things were designated by single names, by class names qualified by more or less long phrases, and less frequently and latterly by binomials as at present, but no definite rule was followed with regard to the matter ; there was no system.

Single names principally sufficed for the natural history writers of antiquity, dealing as they did with few kinds of animals or plants. However, when, with the revival of learning, attention was paid to their works as a source for information, especially in the interests of the healing art, and accordingly for an insight into the materia medica of ancient Rome and Greece, the identity of both the animals and plants, on which their single names had been bestowed, puzzled the most erudite, and has in some instances to this day remained unsettled. Special reference being made to the writings of Artedi, Gesner, Fuchsius, Matthioli, etc., to which Hallam and others have referred.

At the same time, the designation of natural objects by phrases, recapitulating salient features—attached to generic titles, found in the works of writers of the seventeenth and earlier centuries, and of which we have a few examples —relating to Australian vegetation—in the "Voyages" of Dampier, 1696, early proved not only cumbersome, but constituting a nomenclature making for practical use excessive demands on man's memory, a fact alone sufficient to forbid its employment.

A service then, conferred on the student of Nature by Linnæus, was that of devising a system—now universally

followed—of separately designating the different living objects—plant or animal—that it comprises. In this, two terms are used, one implying genus, and the other species, and both essential.

But what is a genus, what a species? In taking a comprehensive view of a number of representatives of the animal and vegetable kingdoms, we soon discover that there are individuals that resemble each other sufficiently to make us conclude that they are all, or rather have been all, immediately descended from a common parent; the faculty of interbreeding indefinitely or not, affording the test of the accuracy of our judgment. These individuals considered in the aggregate, we apply the term *species* to, and distinguish in each case by a term—the specific term.

In the same way a number of species that resemble in each case one another more than they do any other species, we collectively style a genus, and distinguish it also by a term—the generic term.

As thus the species is formed by the union of like individuals, so the genus is formed of the union of like species. The latter category is often a very arbitrary one, its definition being based on the whim of its propounder; but oftentimes it is such as a child may recognise.

The system of nomenclature, above referred to as that of Linnæus, involved the bestowal on every animated object of a designation then, consisting of two terms, one adjectival or qualitative denotive of the species, and one substantive implying the genus. Thus *sida retusa*, *sida* genus and *retusa* species. And that this kind of nomenclature might be used and understood by all naturalists, of whatever nationality they might be, it was necessary that they should be in a language understood by all. As Latin was the idiom in which most scientific books were written, at the time that this nomenclature was established, that language was chosen as the universal language of science in this respect; words derived from the other dead languages being latinised when had recourse to. Thus both generic and specific terms chosen as the titles for animals and plants were either Latin or partook of its form—the adjectival or specific following the generic or substantive, in accordance with the structure of this language, and which requires a different order from that found in our own vernacular: thus *sida retusa* is used, and not *retusa sida*.

In the bestowal of names for living objects, many writers, however, had conformed in certain instances to this principle for their constitution, using thus two terms only, and this they did, long prior to the time of Linnæus.

As instances of this may be mentioned: (1) The procedure, followed by the well known naturalist, L. Fuchsius (or Fuchs)—whose name is commemorated in

that of the popular Fuchsia. When writing in 1542, *i.e.*, nearly two centuries prior to the time to which we are now referring—Fuchsius then in many cases employed generic and specific terms for plants after the manner of Linnæus, and the latter adopted the designations he had thus early bestowed. It is this German botanist who is really sponsor for Amaranthus purpureus, Atriplex hortensis, Helleborus niger, Lilius croceus, Cannabis sativa, Nymphæa lutea, Trifolium pratense, and many other scientific plant-names. Similiarly (2) the French Botanist, Cornuti, writing on the flora of the environs of Paris in 1635, nearly a century later, used names—according to this nomenclature also—that closely approached in conciseness these adopted by Linnæus himself. To Cornuti, we owe thus Campanula rotundifolia, Mentha aquatica, Pinus sylvestris, Rosa canina, and other plant designations with which we have since become familiar.

None of Linnæus' predecessors had however previously propounded as an axiom : that it was possible by following such a system as that laid down by him, to designate every different animal or plant in accordance with a single principle of procedure. The practices of the naturalists of two centuries conforming to Linnæus' precept and example have shown that such possibility exists.

But Linnæus not only did this, but he brought together in two works the *Species Plantaruma* and the *System Naturæ* approaching perfection with the successive editions through which these passed, the recorded knowledge of all the workers of zoology, botany, and mineralogy, since the world began, designating each animal or plant mentioned therein by a binominal name, original or derived, and in accordance with his system.

The reputation that he has gained for this work may be concluded from the following facts :—Owing to the vast number of animals and plants already known, or been made known—the animals alone, according to a statement made in 1905 by the Veterinary Zoologist of U.S.A., Dr C. W. Stiles embrace quite 120,000 named genera, a number that is increased to the extent of quite 1,150 per annum, it has—under these circumstances then—been found necessary to propound under competent authority stringent rules, prescribing the method of bestowing names. Thus the International Zoologists' Conference, held at Berne, in 1904, formulated an " International Code for Zoological Literature," as did the Vienna Botanical Congress for 1905 " International Rules of Botanical Nomenclature." Now both of these codes, as do previous ones of the same description, recognise the obligations to follow the Linnean system, to consider certain specific names of animals and of plants as finding their origin in those names mentioned

in his books referred to; and to honour those names that he bestowed or adopted; deciding to repudiate and discard all others by which different kinds of animals or plants were designated, in the publications of previous investigators; creating thus a law of priority (for names of species), stopping in its retrospective effect at the issues—of 1756 and 1758 respectively—of these two above-mentioned epoch-making works of Linnæus.

LINNÆUS AS A CONCISE DESCRIBER OF ANIMAL AND PLANT FORMS.

Now in addition to the system of naming alluded to, Linnæus may also be said to have inaugurated the method of precise description as applied to living things.

The great anatomist of the last century, Sir Richard Owen, after uttering the truism that "the best workman uses the best tools," adds, "Terms are the tools of the teacher, and only an inferior hand persists in toiling with a clumsy instrument when a better one lies within his reach," and—himself a master of accurate and concise expression—described Linnæus as one "to whom mainly is due the discernment of the powerful instrument of well-defined terms in acquiring a systematic science of nature, and to whom we owe the best knowledge of its use." —(Comparative Anatomy of Vertebrate Animals, Vol. I., p. XVIII).

A comparison of the wordy and puerile descriptions of plants given by Leonard Fuchsius—or by the botanists of the seventeenth century, with these of Linnæus, will serve to emphasise this character of the latter's work. And one may recall the fact that Rabellais, a contemporary of Fuchsius, in his well-known satire, "Pantagruel," found it necessary to ridicule these ponderous descriptions that confronted the reader of new botanical works of his age, by giving a like account of a plant that he styled *Pantagruelium*, that he concluded with the statement—in harmony with the remainder of the description—that it should be sown when the swallows first appeared and harvested when the song of the cicada was heard in the land.

Reverting to the precision characterising the Linnean descriptions, it may be mentioned that the Botanical Congress referred to agreed to associate with the genera, the names of which appear in the "*Species Plantarum*," that botanists are pledged to honour, the descriptions of them given by him also in his *Genera Plantarum* (5 Ed., 1754). Thus indicating how well, after a lapse of 200 years, his definitions of plant genera were appreciated, and what adequate ones they really were. The priniciples that guided him in this work were already enunciated by Linnæus

in 1736, in his *Fundamenta Botanica*, that a botanist of a later age—S. H. Vines—has spoken of as being "An unrivalled descriptive apparatus that must always be regarded as one of his many great achievements," and that constitutes Linnæus—to quote another, H. Fries—"the real lawgiver in the realm of descriptive botany."

Linnæus as a Propounder of Systems of Classifications.

Linnæus, however, not only served as the father of scientific nomenclature of animals and plants; and, as the champion and exemplar of accurate and concise scientific language in their description; but also, as the elaborator of systems of arrangement for one and the other.

First, to consider this aspect of his work from a botanical standpoint. Authors living prior to the age of Linnæus (1707-1778) dealing with but a small number of kinds of plants, were content to arrange them in accordance with their general aspects—under the terms trees, shrubs, herbs, etc.; or, regarding them from the point of view of the physician, to group them with respect to their properties.

Cæsalpinus, however, writing towards the end of the 16th century, attempted an arrangement founded upon both fruit and seed. Tournfort, in 1694, propounded a system based on characters afforded by the floral-envelope after first dividing plants into herbs and trees (including shrubs). The English botanist, Ray, writing a hundred years later than Cæsalpinus (1668-1703) not only distinguished in his classification between dicotyledons and monocotyledons, but also took cognizance of the characters of flowers regular and flowers irregular—marking a great advance.

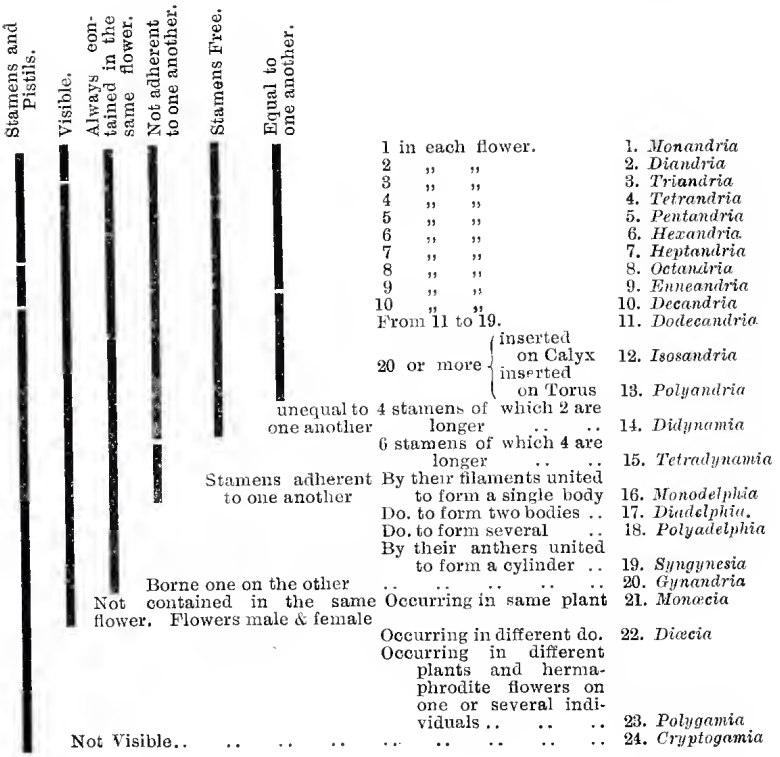
These successive efforts, aided materially by the numerous figures of plants issued by various writers on the subject, led, moreover, to certain well defined groups of plants being recognised, *e.g.*, Glumaceæ, Umbelliferæ, Labiatæ, Leguminosæ, and the bulbous kinds.

All the systems for the arrangement of plant species, propounded from the time of Cæsalpinus to that of himself, Linnæus discussed in a work issued in 1738, named *Classes Plantarum*.

In 1735 (*Systema Naturae*, Fol. ed.) he further set forth a system of his own, in which he based the arrangement of plants, on characters presented by the essential floral organs (stamens and pistil), the relation of the stamens with the latter, their occurence with the pistil within the same flower or otherwise; their individual freedom or

coherence, and the number in which they were present. This arrangement is set forth in the following table :—

LINNEAN SYSTEM OF PLANT CLASSIFICATION.



This system devised by Linnæus for the arrangement of the members of the vegetable kingdom, is what has been styled an artificial one, since by a kind of artifice plants are grouped together ; not according to natural relationship often patent on observation, but by reference to single arbitrarily-selected characters, with the result that naturally related plants are widely separated, and very different plants are associated in the same group.

Thus in the six-stamen one-pistil group of Linnæus, we find the Rush and the Berberry ; in the six-stamen three-pistil group the Vine and the Periwinkle (Vinca) ; in the five-stamen two-pistil group the carrot and the gooseberry, in another the Canna and salt-wort (*Sueda*), and so on. [*Vid. Species Plantarum, pas.*]

This system, to-day, is regarded only as an historical monument. It has, however, rendered great service to science in years that are past. Not only were Linnæus' own systematic botanical works, which are the foundation of what we know now, regarding plant species, based upon

it, but many other treaties on Botany and on Floras also. This is the case with Sir William Jackson Hooker's "British Flora," in the introduction to the 1838 edition of which will be found this testimony as to its value :—

"In regard to the first object (a description of our native plants arranged according to the simplest method), the experience of nearly 100 years has proved to every unprejudiced mind that no system has appeared (Jussieu's and De Condolles were then extant) which can be compared to that of the immortal Swede, for the facility which enables anyone, hitherto unpracticed in botany, to arrive at a knowledge of the genus and species of a plant."

Our own esteemed Colonial Botanist, F. M. Bailey, F.L.S., made his first acquaintance with systematic botany in the study and application of Linnæus' method of arrangement. The eminent use of his *system* he discovered thus early, and to-day waxes eloquent in descanting on its merits.

The great Cuvier compares such an artificial system that enables us to find with ease the names of natural objects, to a dictionary, but with this difference, that here the characters serve us to find the name, whereas in ordinary dictionaries the name serves to acquaint us with the characters.

Linnæus and Classification According to Method of Nature.

That a systematic arrangement should, however, express Nature herself, and be in fact what is styled a "Natural Method," it should associate, as wrote Andrien de Jussieu, genera that have the greatest number of relations with one another ; and, consequently, employ not alone certain characters only, but all the characters at once, *i.e.* adopt a reverse process to that of Linnæus.

It should, moreover, not only count characters, but weigh them, recognising a principle of subordination amongst them, in formulating its groups. This was the distinguished merit of his worthy parent's (Antoine Laurent de Jussieu) natural arrangement of plant species, to embody.

The purpose of a natural system of classification of living things is not to serve only as a means for discovering the name of an object, but to bring together and distinguish those that in the greatest number of respects correspond, so as to distinguish the components of a great organic whole by a true image, and as this image may be represented by a tree and its branches, and can only so be represented, to develop, as exhibited in a tree, the order of succession in time of the different parts comprised—especially of genera and species, or their descent. A classification thus becomes

not only an image of animated nature, but an epitome of the entire science of living things. A picture due to the Dutch Zoologist, Van der Hoven.

Such a "natural method" of arrangement so far as plants are concerned, attempted by the pre-Linnean English botanist, Ray, was carried to a high degree of perfection by Antoine Laurent de Jussieu, in 1789, in a fundamental work in which are given the characters of all the genera then known, disposed in natural families. But although this has been improved by A. P. De Candolle, Endlicher, Lindley, Brogniart, Hooker and Bentham, in some respects, and is practically the method of arrangement of plants now favoured, that portion that relates to the Monochlamydeæ, or plants having flowers of a single envelope, is still unsatisfactory, as the last-mentioned botanists admit. (*Vid. Genera Plantarum*, preface).

At the same time Linnæus was not insensible to this requirement in the comprehensive view of plant life, as will be shown subsequently (p. 22). in briefly considering his position as a philosophical naturalist. and, indeed, the late Director of the Royal Botanical Gardens, Kew, England, has protested that "these have done scant justice to his immortal memory, who find in his artificial system his chief claim to fame." (*Proc. Lin. Soc., London.* Session 1887-1888, p. 76.). And Professor T. H. Fries. cherishing a like opinion in his well known "Eulogium on Linnæus," pronounced on the centenary of the foundation of the Linnean Society, thus referred to him, as "one who laid he chief ground work of the natural system" of botany.

LINNÆUS AS PHYSIOLOGICAL BOTANIST.

Reference to the seven volumes of Linnæus. *Amœnitates Academicœ* will indicate that physiological questions also largely claimed his attention. Under the title "Sponsulia plantarum" he dealt with the office of pollen and the theory of sexuality in plant life. He also treated therein of what he styled "generatio ambigena," the sleep of plants; as well dealt with the phenological facts in a section entitled "Calendarium Floræ," and with plant metamorphosis and theoretical morphology, under the heading "*Prolepsis Plantarum*," a subject pursued afterwards with such success, but in a different manner, by Goethe.

LINNÆUS AND THE PLANTS OF AUSTRALIA.

Although Linnæus is regarded by botanists as the sponsor for the names of 352 (95 nat'sd) or more Australian plants, and *L.* or *Linn.* is attached to their specific designations accordingly, it may be affirmed nevertheless that no specimen emanating from this continent was examined by him for descriptive purposes. In fact, when his title is

attached to the name of any one of our Australian plants, it is an indication that this plant occurs beyond the limits of the continent; and that Linnæus (or those whom he followed), had Australian plants from extra-Australian regions before him when he bestowed or adopted the names which are now credited to his authority, as was actually the case. Thus no reference to a single Eucalypt occurs in his voluminous writings.

When it is called to mind that Cook's visit to Australia (during which he was accompanied by the naturalist Banks, the botanist Solander—himself a pupil of Linnæus, and the botanical artist, Parkinson) took place in 1700 (August-May); and that the plant collections, the property of Sir Joseph Banks, were not "worked up" on his return in 1701, or indeed, for some years afterwards, although descriptions and illustrations of them had already been prepared, not in fact, until 1863 in many cases, when the first volume of the *Flora Australis* was issued; and that Linnæus' descriptive works practically ceased in 1774, when severe illness overtook him; one can understand why this silence with respect to our vegetable products arose.

An apparent exception may be found with respect to *Banksia*, and four of the species of the genus that we know best. These, however, were not named or described by Linnæus, but by his only son, and not till three years after the death of his father; the definition of the genus, and the account of the species alluded to appearing in the *Supplementum Plantarum* (1781) of the younger Linnæus. It is not difficult to assign reasons why specimens of these peculiar Australian plants only were communicated; the name *Banksia* bestowed upon them might be regarded as suggestive of the explanation of the fact.

LINNÆUS IN RELATION TO HIS WORK ON ANIMALS.

INTRODUCTORY.

Hitherto, emphasis has been given to Linnæus' botanical work, although it was mentioned in referring to his *Systema Naturæ* (of which the Folio Edition, 1735, and the Octavo one of 1753, are really separate productions) that he dealt equally with animal life. Moreover, it has been told you also when considering his systems of naming living things, that zoologists to-day honour by acceptance both the titles and descriptions of the animal species that he recognised; and that, in all claims for priority of discovery on behalf of investigators, they have decided that Linnæus' *Systema Naturæ* (edition 1758) be the first and earliest book to be taken into consideration, when dealing with the names of species of animals; reference to all previous writers being ignored; Scientific nomenclature from the point of view of the zoologist dating thus therefrom.

SYSTEMATIC ARRANGEMENT OF ANIMALS.

Linnæus' classificatory arrangement of animals, unlike his plant system, was in part a natural one.

In his primary division he followed Aristotle, although instead of separating animals, as did Aristotle, into those that had blood and those that had not, *ἔναιμια* and *ἀναιμα*, he uses the terms Red Blood and White Blood as distingishing characters.

His further classification as set forth in the *Systema Naturæ*, is as follows :—

Heart with 2 ventricles 2 auricles : warm red-blooded	viviparous	1. Mammals
	oviparous	2. Birds
Heart with 1 ventricle and 1 Auricle cold red-blooded	with lungs	3. Amphibia
	with gills	4. Fishes
Heart with 1 Ventricle no auricle, cold white-blooded	with antennæ	5. Insects
	with tentacles	6. Worms

Although the first four groups are natural ones, the characters used to distinguish them do not entirely hold good. Thus some animals have no heart, and the Amphibia (as Linnæus understood them, *i.e.*, including the Reptilia) have hearts possessing not one auricle, but two.

It will be noticed that in his system no regard is paid to the skeleton, and we accordingly miss what is implied in the terms *Vertebrata* and *Invertebrata*, of more modern systematists.

With regard again to Linnæus' last division six, worms, or "Vermes," reference to any recent work on zoology will show that our knowledge of the subject has so advanced in every way since his time (thus might even be said of the age of Cuvier) that it has undergone a complete revolution, and given place to a new and far vaster structure.

The late Prosessor W. H. Flower, in a paper read before the British Association for the Advancement of Science, in 1878, the centenary anniversary of Linnæus' death, in reviewing Linnæus' treatment of the Mammalia in developing further his classification in the 1st volume of the 1766 edition of the *Systema Naturæ*, states, however, with regard to his treatment of this, his first division of animals, that the advance in knowledge since Linnæus' time has on the other hand only extended and reformed that discovered in the work of this great investigator.

One point, in dwelling on the difficulites in this work, under which Linnæus laboured, he specially mentioned :

"I must remark in passing, (said Flower) upon what is the greatest, and indeed most marvellous difference between the zoology of our time and that of Linnæus. Now we know that the animals at present existing upon the earth are merely the survivors of an immensity of others, different

in form, characters, and mode of life, which have peopled the earth through vast ages of time, and to which numerically our existing forms are infinitesimally small, and that the knowledge we possess of an immense number of them, fully justifies the expectation of an enormous further advance in this direction. In the time of Linnæus the existence in any past time of a species having no longer living representatives on the earth, though perhaps the speculation of a few philosophical minds, had not been received amongst the certainties of science, and at all events found no place in the great work we are now considering."

At the period covered by Linnæus' literary activity, 1735-1770, the Australian Fauna was almost a *terra incognita*. Our marsupials were unknown to European naturalists, and generally speaking only world-roamers comprised amongst our animals had come under their notice. In fact, they perforce had to draw the material, on which they founded their statements, from the old world, or from the earlier explored regions only of the new.

Accordingly the names that distinguish both the higher and the lower animals of this continent, are generally speaking not ones that we owe to Linnæus, although he is sponsor for the appelations of many of our genera that have extra-Australasian representatives. Amongst vertibrates I can however recall the dugong, and a dozen of our birds, that are known by the technical terms by which Linnæus designated them, nearly two hundred years ago.

The group of mammals that includes the Dugong and Manatees, that is now named *Sirenia* of Illiger, and that is an isolated one without relation with any other animals, Linnæus regarded as embracing the Walrus, from which they are perfectly distinct, and assigned to it the name *Trichechus*. These animals he regarded also as one, his acquaintance with the Dugong through the account that had been published in Dampier's voyages, being necessarily superficial. Buffion's description and figure (skull) *Histoire Naturelle* XIII., was probably published at almost sufficiently early a date to assist Linnæus in this matter. In accordance with his artificial classification, moreover, he included both in his order *Bruta*, that he had characterised as lacking front teeth (Dentes primares) above and below, and that contained also such dissimilar animals to them and to each other, as are the Elephants and the Sloths. Cuvier, the successor of Linnæus, placed them amongst the Cetaceans or Whales, with which again they have but few affinities. In a Brisbane newspaper dated January 28th of the present year, the Dugong is spoken of as "a large *fish* of about the size of a porpoise"; *mirabile dictu!* This is an example of the present state of popular science in Queens-

land, and suggests an ample field for the Field Naturalists' Club to cultivate.

NOTE.—Writing in this connection I would use this occasion for bespeaking the interest of the members of the Club in urging the preservation of this remarkable animal—the Dugong (Halicore australis), which feeding in shallow water, partaking of a special plant (*Halophila*) growing therein, and increasing at a very slow rate, might be readily exterminated by the hand of man, like another sirenid, the great extinct Sea Cow of Berring Island (*Rhytina Stelleri*) has been, if its capture were once deemed commercially profitable. The oil from the whole of the Dugongs of our coast would not keep a single up-to-date soap works going for a week, to allude to the use to which it is now proposed to put the animal. Unfortunately this opportunity cannot be further embraced to plead the cause of our native animals—both bird and beast—whose extermination in so many cases is threatened by ignorant and rapacious man.

INSECTS.

Linnæus in his division of animals, *Insecta*, included not only those forms that we now distinguish as such, but the Myriapoda, Arachnids, and Crustaceans also, it being equivalent to the Arthropoda of more modern systematists. The possession of a body composed of successive rings, and limbs of a series of joints, comprising the characters of the class, besides these already mentioned.

The principal divisions of insects as were then understood, *i.e.*, small animals lacking blood, had already been recognised by Aristotle, and by his disciple and successor, Theophrastus; and, moreover, a classification had been put forward by Aldrovandus, who included worms, and even star-fish in the group.

The English naturalists, Ray and Willoughby, of the seventeenth century, introduced to public notice through their writings, systematic arrangements of insects, in which for the first time regard was had to the transformation they undergo for providing characters.

Swammerdam (Historia Insectorum, Gen^{m}. 1669) wholly relied on this character, and on the features presented by the larval forms; a classification that from the obscure distinguishing principles on which it was based, being thus arrived at, that was impracticable for application by the work-a-day naturalist, although a natural method of arrangement.

Linnæus' classification was an improvement on those that had gone before. Absence (*Aptera*) or presence of wings, and their number; the whole (*Coleoptera*) or partial (*Hemiptera*) opacity of the fore-ones; the presence of scales

upon them (*Lepidoptera*) or their membranous nature; and in the latter case the presence of a sting (*Hymenoptera*) or its alscence (*Neuroptera*) were regarded as fundamental characters.

The group of *Aptera* (Wingless Insects) contained an heterogenous residue of animals including all the crustaceans, myriapods, spiders, ticks, mites, etc.

The meagre treatment that Australian insects has received at the hands of Linnæus finds its explanation in circumstances that have already been set forth, but seeing that the different genera that they comprise are in many cases represented in the faunæ of countries that had been investigated at the time that Linnæus wrote, many of the insect genera with which we are called upon to deal are Linnean ones.

But eleven of our common butterflies bear names that this great Sweedish naturalist thought good to bestow upon them; the Linnean species include, amongst others, the Red Wanderer—Danaus plexippus; the one our youth name "Purple Dot"—Diadema bolina, and its two congeners; the beautiful northern red and purple C. Cydippe; the Leaf Butterfly, Melanitis Leda; two of our larger "Whites"—C. pyranthe and C. scylla; a common "Blue"—P. bœticus; a "Yellow"—T. hecabe; and the "Skipper"—T. augias. He also names the typical forms of three of our "Papilios"—the "Superb Blue"—Papilio Ulysses; P. Sarpedon (the "Triangle" of school boys); and P. agamemnon. Also that glorious giant butterfly, Ornithoptera priamus—of which Queensland has three local races, and which he remarks is—"Papilionum omnium Princeps longe augustissimus totus holosericeus, ut dubitem pulchrius quidquam a natura insectis productum." The examples of a butterfly that to him was, as he here says, the most beautiful of Nature's creations in the insect world, were derived in his case from Amboina, and not from our State, that also it adorns.

Whilst referring to Linnæus' work in connection with Animal life, allusion must be made to his successful method for the production of pearls through the stimulation of a pearl-yielding molluse, a method that he demonstrated before a select committee of the State Council in Sweden, in 1761, his art being at first kept secret, but made known eventually to a Gothenburg merchant for some monetary consideration. It appears that the fresh-water mussel *Unio margaratifera*, was the object of these experiments. All that is ascertainable regarding Linnæus' connection with this discovery has been brought together by Prof. W. A. Herdman in his Presidential Address for 1905, delivered before the Linnean Society of London, and finds place in its proceedings for that year.

Worn with the labours of a strenuous life, Linnæus wrote but little pertaining to zoology subsequent to 1770—eight years before his death, that had been preceded by paralysis in 1774; consequently, even if the collections pertaining to Southern Hemisphere and Australia secured by disciples of his, Banks, Solander, Sparmann, and the Forsters, amassed during Captain Cook's three voyages, 1769-70, 1772, and 1777, were available at all, they did not come within his field of operations.

GENERAL ERUDITION AND REVERENCE FOR AUTHORITY.

In addition to these features in Linnæus' work already alluded to, mention may be made of his great erudition, and his mastery of what had been recorded by previous writers on the subject of animal or plant life. This remark is not alone applicable to the works of classical antiquity, Aristotle, Aelian, Theophrastus, Dioscorides, and Pliny, but to those whom he dignified with the title of Patriarchs of Botany:—Bauhin, Dalechamp, Fuchsius, Tragus, etc. This erudition is shown, not only in his *Systema Naturæ*, and in his *Amoenitates Academicæ*, but in all his works.

Hallam, the historian, has suggested that in some cases he ignored what the labours of his precedecessors had accomplished, especially mentioning Gesner in this respect, but it is more probable that if he apparently did this, it was in consequence of his having decided to draw on ancient sources first-hand, to which this great student of animal life—Gesner—was also indebted.

But his erudition had not only a retrospective tendency, for he made it his business to familarize himself also with all contemporary natural history literature as was practical to do in his day, and to see whenever possible examples of the animals or plants of which it treated.

TRAVEL.

He regarded it as consistent with his purpose to travel much. His first scientific journey was an expedition into Lapland, when he was 25 years of age. Those who—like the present speaker—have had an opportunity of reading that quaint work (published in 1811, by Sir J. E. Smith), entitled "*Lachesis laponica*," containing an exact translation of the young naturalist's impromptu record of his itinerary, illustrated by wood cuts based on his crude drawings on the occasion of his tour, and have pursued to some extent the path in Northern Europe that he then followed, also collecting plants, will appreciate, what interest in travel for Linnæus consisted in.

After a visit to Holland in 1735 for the purpose of taking his medical degree at Harderwyk, he in the following year proceeded to England, returning to Sweden in July, 1738,

by way of France, and Holland again. In 1745-6, he further visited Gothland and Zeatland. Each of these journeys was the occasion of special books being written and published, principally in the interests of local botany of these regions.

Besides going abroad, he toured his own native land, Sweden, publishing works devoted to its Fauna and to its Flora in 1745.

The naturalist who was bent on travelling, he impressed with the expediency of visiting his own country especially; urging this in a special work, entitled, "*Oratio de necessitate peregrinatantis intra patriam.*"

Materia Medica.

Whilst interested in descriptive and systematic natural history, Linnæus did not neglect the economic features of his subject; the *Materia Medica*, that he issued for his Upsala University Students in 1749, bearing witness of this. In the introductory section of the *Systema Naturæ* that deals with plant life, this reference to the uses of plants he especially enjoins on the descriptive botanist.

A Philosophic Naturalist.

He also appreciated Nature from the broader standpoint of a philosopher as his *Philosophia Botanica*, much of his *Mantissa Plantarum*, and especially his "Prolepsis Plantarum" (dealing with homologies of plant organs) contained in the latter indicates.

Although he gave concise descriptions of the genera of living things, which have always been commended, in his *Genera Plantarum*, that in consequence has been referred to as "perhaps the most important and valuable of his works," still he maintained that *character non facit genus*. This position he amplifies in his *Systema Naturæ* (Botany: Introductory Section, No. 26). "Genus itaque omne est naturale confirmante natura, saltum non faciente. Character ergo non constituat umquam genus sed sedulo secundum genus naturæ conficiendus est.": statements that may be expanded in the way E. Meyrick has done. "It is sometimes (this entomologist writes), said that genera are artificial creations. If by this is intended that they consist of a certain number of species having no other relation than the common possession of certain characters, the statement is not true of any sound system, and the systematist that makes it stands self-condemned; but if it be only taken to mean that the precise limits of genera may often be differently conceived by different workers, it is to that extent quite true." *Handbk. Brit. Lepidoptera*, p. 11, 1895. I am glad to pay this tribute to an entomologist like Meyrick, who has done so much to demon-

strate that any natural system of classification must admit the principle that the question of descent has much to do with the relationship that obtains between genera and genus, and one species and another.

Linnæus has been referred to as stating in his *Philosophia Botanica*, that the first object and the last hopes of the botanist is to arrive at a natural classification of plants. And although his name is usually connected with the artificial arrangement, spoken of as the Linnean system, it must be admitted that he regarded this as a transitory arrangement only, to meet certain requirements. Already in 1738, he published his *Fragmenta Methodi Naturalis*, indicating the bent of his great mind. W. Thistleton Dyer, too, in writing on the subject of G. Bentham, quotes the following passage from Linnæus, as indicating that his real intellectual greatness consisted in the constant pursuit of a natural method of plant arrangement :—" Diu et ego circa methodus naturalis inveniendum laboravi, bene multa quæ adderem obtinui, perfice non potuo, continuaturus dum vixero." (Classes plantarum, 1738, p. 484). A former Leyden Professor of Zoology, Van der Hoeven, referring to this method, has written, " if this natural system were quite perfect, it would not merely be a register of names of animals (or plants), or a large lexicon (using the simile of Cuvier above referred to), but a true image of the animal or plant kingdom, and a short survey of the entire science. The more nearly science approaches this end, the greater will be its perfection." Such are the fruits of philosophy.

BOTANICAL GARDENS AS AID TO STUDY.

Whatever success has been attained in approaching this goal, has been mainly through examining living plants. This was true of the English Botanist of the seventeenth century, Ray. It was true also of Linnæus himself, and although he was greatly beholden to travel, much of his work was accomplished through the aid of Botanical Gardens; four of his special works relating to his observations therein.

The natural system of the classification of plants propounded by Antoine Laurent de Jussieu, which succeeded to that of Linnæus, and that is followed with but little modification. (introduced by Endicher and De Candolle) in modern works, was based, as had been Adansons previous inconclusive labours in this direction—principally on the researches rendered possible by a botanical garden, and so to the title of the *Genera Plantarum*, in which this is proclaimed, he adds, " *juxta methodum in horto regio Parisiensi exaratum.*"

The measure in which the progress of botanical science is thus promoted by the existence of collections of living plants suggests this reflection : Queensland is singularly

well provided with "botanical gardens," so-called : but still lacks an institution of the kind established on modern lines ; such (for instance) as the beautiful and fruitful Botanical Gardens of Buitzenzorg, an institution that is called upon to face problems similar to those that confront us here :— After its example, a Botanical Gardens to fulfil its purpose should embrace the following divisions :—(1) Herbarium and Museum ; (2) Botanical laboratory ; (3) Chemical laboratory ; (4) Pharmacological laboratory ; (5) Horticultural section for the experimental investigation of living plants ; (6) Library ; (7) Indigeonus Flora research division ; (8) Branch botanical gardens ; and (9) Experiment Stations devoted singly to the more important tropical cultures. (10) The gardens proper of such an institution, should contain again exponents of the different orders of plants, as comprehensive as possible and grown in botanical groups. Each above division of the Institution, moreover, should be under the skilled management of a professional trained investigator, and be provided with the fullest facilities for research ; and the whole of them be actuated by a common motive, enforced by the example and precept of the directorate, making for the advancement of the science of plant life and its many applicatcns in securing material wealth.

The progress of science demands a Botanical Gardens established on a more comprehensive plan, than could be realised during the age in which Linnæus lived, but the gardens of Upsala, Paris, Leyden, and Oxford, as well as the private gardens of Dr. Clifford, that proved so servicable to him, were—as far as they went—already nearly 200 years ago, conformable to this ideal.

Drawings.

In determining the plants entering into the descriptions of previous writers in order that they might be brought within the compass of his *Species Plantarum*, his *Mantissa Plantarum*, etc., Linnæus was greatly assisted by the figures by which many of these were illustrated, a remark especially applicable to the publications of the two preceding centuries. As an instance of the nature of this help, may be mentioned the memoir of Fuchsius, written in 1542, which, according to St. Pierre, contains 500 (519 in the French edition, Histoire de Plantes, Paris, 1549. H.T.) outline figures of great excellence, the author stating that he had declined to have these shaded, lest the exact form should be obscured. Fuchsius, moreover, laid great stress on these, for he said, that, good designs were always clearer presentments than the best descriptions, and that they had the advantage of appealing with greater force to the memory of the learner. Some of Linnæus' works alone are accompanied by plates.

In this connection, the value of drawing in nature study might be emphasised, as a means of impressing oneself with—or of insisting on—facts, although it has further advantages, apart from this discipline, in ministering to the instinct for art and its embodiment. Ruskin, in his Modern Painters, IV., p. 36, wrote "Paint the leaves as they grow. If you can paint one leaf you can paint the world," a proposition whose truth he illustrates by reference to the work of great masters. The context indicates that he has in view drawing as well as brush work. I was once informed by a Queensland botanist that in the Malay language, the word "to draw" was identical with that meaning "to write," a statement that seems to imply more than that literary expression was originally pictographic. "All the orchids (he stated) I meet are written down, to use a Malay expression for drawing—tulis bunga it—write a flower." (Sortechini).

A French Botanist—E. Germain de Sant Pierre, thus refers to Linnæus :—"Le prince des botanistes, philosophe, poete, classificateur, createur de la nomenclature binare."

The Linnean Society of N.S. Wales, in replying to the invitation issued by the Royal Academy of Sciences of Stockholm, to attend the Upsala Bicentenary Celebrations relating to the naturalist from whom it had derived its name, further referred to Linnæus as being the one "qui primus veras in naturæ animantis rationem per orbem terrarum propagavit (who first diffused throughout the world the true meaning of living things)."

I cannot claim acquaintance with the offspring of Linnæus' poetic genius, unless by *poëte* used by St. Pierre is implied its primary meaning "maker." However, it may be added that Linnæus closes his famous *Systema Naturæ* with the lines of poetry that no time will forget. :—

O JEHOVA.

"Quam ampla sunt tua opera !
"Quam sapienter ea fæcisti
"Quam plena est terra possessione tua."

The fact of Linnæus being regarded as a philosopher and a poet, suggests the remark, that there is more in our work than is involved in mere collecting and naming specimens. "The well directed sight—Brings, in *each* flower, an universe to light." My distinguished predecessor in this chair has pleaded for the wider outlook, and the exercise of the æsthetic sense in regarding nature. I would appeal too for a little more of the spirit of Ruskin, as exhibited in his Modern Painters, to be shown in its patient study, and I would ask that the fact be pondered that it was a poet—Goethe—that not only coined the word "morphology," now so prominent a branch of scientific inquiry, but more-

over demonstrated how efficacious an instrument it was in enabling us to interpret flower structure and its history.

Reference to this great man is especially *apropos* since his poetic vocation did not hinder him from pursuing the descriptive sciences, and addressing himself to the general problems of nature with such success in each case as might alone have established his fame. He constantly referred to Linnæus (and to Buffon) in his works. The estimation in which he held the former may be concluded from the following statement on his part:—"Wir es mir dabei ergangen und wie ein so fremdartiger Unterricht auf mich gewirkt, kann vielleicht im verlauf dieser Mitt heilungen deutlich werden, vorlaufig aber will ich bekennen. dass nach Shakspeare und Spinoza auf mich die groste Wirkung von Linne ausgegangen, und zwar gerade durch den widerstreit, zu welchem er mich aussorderte" *Bildung und Umbildung organischer Naturen*" (Goethe. Sammtliche Werke VI., p. 18, Ed. 1860.) This he precedes by the statement "Linnes Philosophie der Botanik war mein tägliches studium."

Linnæus and Buffon.

These two great naturalists of the 18th century regarded living things from distinct points of view, and so arrived at opposite opinions regarding their nature. Buffon had no merit as a classifier, he deemed it of supreme importance to concentrate attention on the individual animal; to ascertain its structure; and to be acquainted with the intrinsic features of living things in general; as did also his collaborateur, the anatomist, Daubenton (*cf.* T. Huxley—Owen's Position in the History of Anatomical Science. Life of Sir R. Owen, p. 280-1.) Linnæus, on the other hand—as we have seen—was *par excellence*, a systematiser, and the value of the characters of living things was with him subordinate to the requirements of his method of arrangement. And aiming as he did at a science of universal nature, the fundamental structure of living things was perforce beyond the scope of his inquiry, where only a superficial view was possible to the single worker. However—and this is overlooked—Linnæus did not less value Buffon's method of inquiry, and thus he wrote:—"Divisio naturalis animalium ab interna structura indicatur." (*Syst. Nat.*, Ed. XII., vol. I., p. 19).

It is not surprising therefore that Buffon rejected Linnæus' system of grouping the members of the animal kingdom. On structural grounds he was bound to discard any arrangement that did such violence to nature as to combine the Walrus, Elephant, Ant-eater, Sloth and Manatee (or Dugong) in a single division.

St. G. Mivart points out again that whereas Buffon was the apostle of the doctrine of the variability of species, Linnæus stood for that of their fixity, and in this respect also differed greatly from his contemporary (*Report Brit. Assoc. Sect.* Biology, 1879. "Essays" p. 193-225—1892)..

CONCLUSION.

Reverting to the principal theme of this address, it may be added that the personal history of Linnæus, his character, his influence as a teacher, and the work of his disciples, notwithstanding the many lessons that they teach, are matters that cannot now be considered without unduly prolonging my remarks. This applies also to any reference to the bearing of his life-work on the establishment of the many learned corporations—including the Linnean Societies of Sweden, London and New South Wales—that perpetuate his memory in their titles, and have built so well on the foundations that his labours have provided.

One thought however, may find expression. Let me mention:—the Royal Swedish Academy of Sciences on 1st February, 1907, issued, throughout the world, an invitation to the celebrations that were to mark the bicentenary of Linnæus' birth. This invitation referred to him, whose memory it was proposed to honour, in these amongst other words:—"E floribus totius orbis terrarum sedulæ apis modo congessit, quidquid posset rerum naturæ ordinem habitumque investigationibus lucem afferre." (Like unto the Busy Bee he gathered from the flowers of the whole earth whatever he could in order to bring light—through his investigations—on the order and character of nature).

The words "*apis modo*" (after the manner of the Busy Bee) in this invitation! How pregnant with suggestiveness are they for us! What word has ever yielded from the earliest time so many figures of speech and similies as has it? The great writers of ancient Greece and Rome, when they had to refer to a people loyally related to a king; to the kingly state itself; to the empire of the king; to the gift of eloquence; the delights of poetry; the love of whatever be sweet and pleasant; the indefatigable exercises of skill and industry; the condition of concord; a long life of health and prosperity; and even, to the blessing of a future life; and not only thus—as here—to the gathering of knowledge from every passing flower, have—let me tell you— again and again employed metaphorical language in which this social insect, the Bee, its habits and its productions, are made to figure. It is even so with those writers of a later age, who have inherited their spirit.

These ideas, virtues, habits, and conditions, typified thus for all time by the Bee, and that so largely—as we have seen—found expression in the life and work of Linnæus,

both so noble, are the influences that will make for the success of our *Field Naturalists' Club*, as an instrument for good. I would fain express a hope then, that it would be your endeavour to realise this truth. I would ask, too, and to this end, that as the Club has chosen poetry for its motto, so also it will accept the Bee, so dear to the poets from great Solomon onwards, for its emblem; this Bee in our case being no exotic insect, but the Australian social honey-gathering Bee (Trigona)—"Native Bee" if you will, that being unendowed with a sting is—whilst potent for good—powerless for evil; taking Horace for our guide:—"Ego apis matinæ more modoque" as he sings—(in my manner and method of work I am as the Bee of my native country)—so too am I a follower of Linnæus, who was so also. The appropriateness of this emblem suffers not from the consideration that—to quote Linnæus once more—"respublica alvearii gynecocratica est." (*Syst. Nat.*, p. 576, Ed. 1758).

APPENDIX.

Linnæus' Writings Chronologically Arranged.

[Withdrawn].

At his death he had published thirty-two larger special works (some of them in several complete revised editions), 187 academic dissertations, 63 treatises for learned societies, 17 programmes, together with no insignificant number of lesser articles, besides what he left in manuscript (Fries.)

January 1st, 1908. HENRY TRYON.

SESSION 1908.

Office Bearers.

The election of office-bearers for 1908 resulted as follows:—*President*, Mr. John Shirley, B.Sc.; *Vice-president*, Mr. W. R. Colledge; *Committee*, Miss A. Hardgrove, Miss D. Sutton, Messrs. G. Gross, R. Illidge, J. Johnston, H. Tryon, and J. Wedd; *Hon. Secretary and Treasurer*, Mr. C. W. Holland; *Hon. Excursion Secretary*, (unallotted).

THE BRISBANE TERTIARIES.*

By SYDNEY B. J. SKERTCHLY, *First President.*

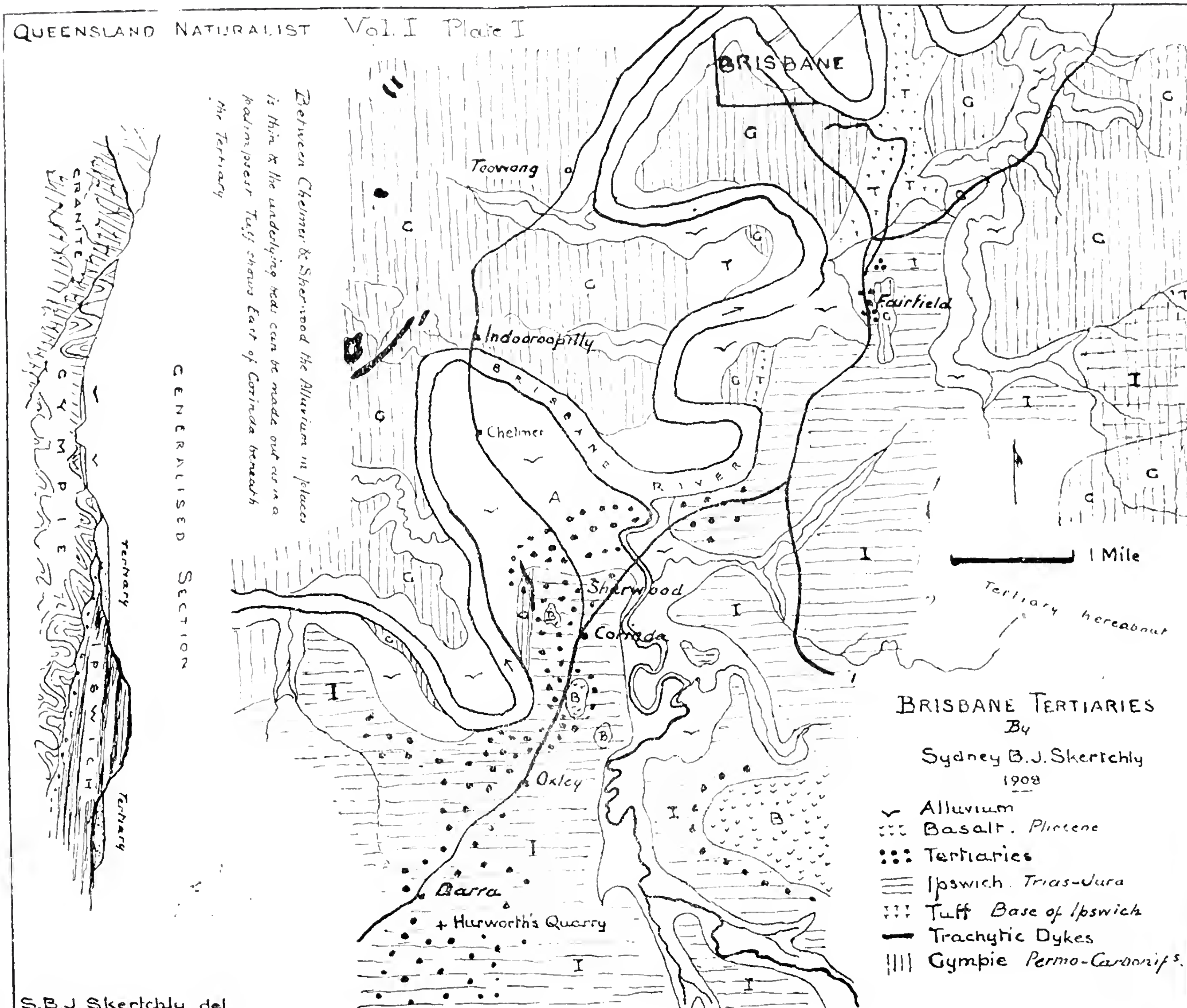
Late of H.M. Geological Surveys of England and Queensland.

The following is a short sketch of the Tertiary beds to which I propose to give the working name of the *Brisbane Tertiaries.* It is selected for convenience, not as being accurate, for the beds do not occur in the city itself, though they come close up it. In the absence of definite stratigraphical and palaeontological evidence as to their precise position, a territorial designation is clearly the best, and as Corinda and Oxley, where the beds are best exposed, are quite small places, residential suburbs of the capital, the convenience of geologists at a distance is best studied by the adoption of a name which at once stamps the locality.

The history of the beds is as follows:—Dr. R. L. Jack, in his "Geology of Queensland" (1892), states that Mr. H. G. Stokes gave him some notes on "The Occurrence of Tertiary Beds in the neighbourhood of Brisbane," which he reproduces. Mr. Stokes clearly recognised (*a*) that the beds, soft sandstones, clays, and loams, were distinct from the Ipswich beds; (*b*) that they underlaid the Basalt; (*c*) that they extended over many square miles between Sherwood and Runcorn; and (*d*) that they contained a flora rich in dicotyledonous plants. Dr. Jack "went over the section carefully," but failed to see "any evidence of an unconformability of more importance than many local unconformabilities which occur in the Ipswich beds." His conclusion is, "I should incline to regard Mr. Stokes's fossils as additions to the flora of the Ipswich Formation rather than as evidence of the presence of Tertiary strata. The whole question can, however, remain in abeyance pending Baron von Ettinghausen's determination of the fossils."

Subsequently the learned Baron sent in a report showing clearly that the fossils were of the well-known Tertiary facies, abounding in European forms—oak, elm, beech, etc., such as characterise all the Tertiary floras of Australasia. I have not seen the report, which was never published. Our president, Mr. J. Shirley, in 1897, published his "Additions to the Fossil Flora of Queensland," and says "at present I prefer to follow Mr. Jack." He tells us the Baron determined sixty-three species—fifty-six dicotyledons, three monocotyledons, three conifers and one fern and that he referred them to the Cretaceous owing to their affinity with the Westphalian flora of that age. Mr. Shirley

* Address: Meeting Field Naturalists' Club, 27th July, 1907.


Between Chelmer & Sherwood the Alluvium in places is thin & the underlying beds can be made out as in a palimpsest. Tuff shows East of Corinda beneath the Tertiary
GENERALISED SECTION
GRANITE
GYMPIE
IPSWICH
Tertiary
Tertiary
BRISBANE
Teowong
Indooroopilly
Chelmer
BRISBANE RIVER
Fairfield
Sherwood
Corinda
Oxley
Darra
+ Hurworth's Quarry
1 Mile
Tertiary hereabout
BRISBANE TERTIARIES
By
Sydney B. J. Skertchly
1908
Alluvium
Basalt. Pliocene
Tertiaries
Ipswich. Trias-Jura
Tuff Base of Ipswich
Trachytic Dykes
Gympie Permo-Carbonif.s
S.B.J. Skertchly, del.

informed me that his MS. copy of the Baron's paper has been mislaid, so that I cannot give his list. Dr. Jack had in the meantime re-stated his belief in the Ipswichian age of the beds, and placing them tentatively "below the thick Murphy's Creek Sandstone and the Clifton Coals and Shales, which give the same fossil plants as the shales associated with the coal-seams of Ipswich proper"—that is, he puts them low down in the Jura-Triassic.

Ten years ago I commenced to map in detail the area in question, during spare time, and in a desultory manner, broken by long absences. I commenced in the Palæozoic region to the west, and have worked eastward, and now live practically on the beds in question. Soon after attacking the "Ipswich" series I found it impossible to "run" the lines of certain loose conglomerates, sandstones, clays and brick earths, without introducing a perfectly impossible series of faults of which there was no evidence whatever, or of complex folds which certainly did not exist. But the stratigraphy was readily explicable on the supposition of an overlap or unconformity. I was driven to this conclusion. I did not start with it as an explanation, and I was naturally inclined to give much weight to those who knew the Ipswich Beds better than myself.

Then our member, Mr. Hurworth, kindly took me to the roadside quarry between Oxley and Darra, which I name in gratitude the "Hurworth Quarry," where we found a wonderful series of dicotyledonous and other leaves which settled the question. I brought to the investigation a long experience of Tertiary rocks, acquired in all four quarters of the globe—and Mr. Hurworth supplied the key to all my difficulties. I have since showed the evidence to several competent geologists, among others, to Messrs. Green of our club, Wearne, of the Technical College, Ipswich, and Brittlebank, of Victoria, and all are convinced. Indeed, Mr. Green informed me that years ago, while mapping the Brisbane area for the Geological Survey, he had been perplexed at finding certain beds lying unconformably upon the Ipswich near Beggo Road railway station; as usual, they were explained away.

Such is the story of these interesting beds. Their final recognition adds a new Formation to Queensland geology, and a fresh page to her history. The credit of their discovery belongs to Mr. Stokes, and I am proud to be able to demonstrate that his acumen led him to the light, and that the oblivion that shrouded his discovery has been only a temporary eclipse. I will now briefly describe the beds, and epitomise the evidence which is so clear that hereafter no one can ever doubt that the Brisbane Tertiaries

must rank with the Tertiaries of the other States of the Commonwealth.

The beds in question have been formed, almost entirely, from the wreckage of the adjacent Ipswich beds, and hence are so like them that lithologically it is not surprising they were not recognised as distinct. Still, as a whole, they are far less coherent, and much of the hardness of the exposed portions of the outcrops, especially in the case of the sandstones and pebble beds, is due simply to surface-hardening. The most typical rock, as Stokes saw, is a pale, fine-grained sandstone, looking much like an impure limestone, but without any calcareous matter to speak of. It is full of very minute spangles of white mica. This is the leaf-bearing rock, and where the laminae are delicate enough in texture, they are loaded with myriads of exquisitely preserved leaves. Messrs. Green and Wearne, on their visit with me, obtained a fine fruit, and Mr. Hurworth has obtained a few casts of shells, apparently Unios. The beds have not been systematically worked for fossils, and there is a very rich field open to anyone with time to spare.

This "Leaf-bed," as we will call it, is underlaid by coarser sandstones, often beautifully ripple-marked over considerable areas, and occasionally so surface-hardened as to be easily mistaken for Ipswich sandstone. Here and there ferruginous beds occur, some clearly due to the reducing action of the vegetable matter, some merely the detritus of the Ipswich. Still higher in the series is a mass of mottled clays, sandy enough to afford good brick-earth. It is of this that the Darra bricks are made.

A very interesting set of beds is well exposed all round Sherwood, from the quarries near the river, all over the Sherwood flat, and giving good sections in the stream courses, the South Brisbane railway cuttings, and at the junction of the Oxley Creek with the Brisbane River. They consist of sands, gravels, and shingle beds, the latter frequently surface-hardened into a spurious conglomerate, which has hitherto been mistaken for the conglomerate at the base of the Ipswich. It is indeed derived directly from it, and only occurs in its immediate vicinity.

The best section is at the gravel pit near the river, on the landward side of the Alluvium near the Carrington Rocks, which are of Palaeozoic age, and here consist of fine-grained quartzite much jasperised. The gravels are not water-sorted, large and small stones and sand being jumbled together. many of the stones lie on edge, and in places great blocks of the palaeozoic quartzites, and of the true Ipswich conglomerates occur, some weighing several hundredweight, and lying over a mile from any outcrop. Large boulders of the

volcanic agglomerate from the base of the Ipswich also occur, and it is singularly full of pebbles and boulders of the jasper above-mentioned. Secondary quartz, in the form of double pointed crystals, exquisitely clear, are common in some places, as at Darra and Wolston, and small pebbles of sapphire, topaz, and garnet, are far from rare, whose significance is evident. These gravels puzzled me much and gave rise to dreadful thoughts. If they were not here in Queensland, but say, in Lincolnshire, I should have unhesitatingly said "glacial."

Mr. C. C. Brittlebank, of Bacchus Marsh, Victoria, the well-known authority on Australian glacial deposits, carefully went over the ground with me, and expressed the same opinion. The conclusion I am driven to is that they do, in many places, show evidence of ice and snow action, and at present I incline to the belief that they represent conditions in which the winters were cold, the streams and lagoons frozen, the hills snow-clad, and that in spring time the melting snow gave rise to floods, and the breaking up of the ice caused the big boulders to be floated off a mile or two from their point of origin. I am reminded, too, of certain curious gravels I have described on the highest parts of the Dividing Range near Stanthorpe. I do not see in this a glacial period. I do see the effects of elevation, but cannot give my reasons here. But they are confirmed by a remarkable exposure of "scree" at the quarry at the Sherwood end of the Corinda ridge (in Gympie rocks), which is quite unlike the modern hill-waste, and exactly like the frost-scree on cold mountain slopes. The scree is of the age of the Tertiaries.

This is only a slight sketch of some of the features of these interesting beds, chiefly in illustration of the Excursion of our Club, which I had the privilege to conduct over the ground.

To summarise the proofs of the relative age of these beds we may say :—

(1). They are unconformable to the Ipswich Formation, for they overlap it, lying partly on the Gympie, and extending over the basement conglomerates and agglomerates of the Ipswich, high up on to the series.

(2). They occupy a definite physiographical horizon, never rising to the heights attained by the Ipswich, and they are often cut entirely through, so that in places, as near Oxley, where the ground is much intersected with creeks, they are seen lapping round the knolls like fringing reefs. This proves them to lie upon an old surface of erosion of the Ipswich beds.

(3). The plants are decisive. If they were of Ipswich age it would follow that here alone, in all the world, a rich dicotyledonous flora existed in the earliest Trias-Jura epoch. This is inconceivable, and I cannot imagine how anyone who ever saw the fossils had any doubt as to their Tertiary age. I am inclined to class them with the Laramie Beds, that is very old Eocene.

Finally, I may add, that near Hillside Farm, Oxley, these beds have been cut through by the Brisbane River.

I have much more evidence, which I hope to publish in the transactions of our Royal Society. It suffices here to have vindicated the views of my old host in the wilds of Queensland, Mr. H. G. Stokes.

NOTE.—The accompanying Map is to be regarded as only a sketch or key.

NOTES ON SPECIMENS OF MAGNESITE FROM NEAR TOOWOOMBA, Q.*

BY LEONARD C. GREEN, M.I.M.E., ETC.,
AND ARTHUR T. HOCKINGS.

Among the specimens collected during the late visit of members of the Field Naturalists' Club to Toowoomba, were some rather interesting specimens of Magnesite. The mineral occurred in the basalt of that district, some five miles due south from Toowoomba, near Rocky Mountain. The age of the basalt, which is the remnant of a very large flow, has not yet been determined; but if connected with the flows, which are now found as outliers in the Brisbane district, there is proof of its being of Post-Tertiary age. At Corinda such an outlier occurs resting on eroded surfaces of Tertiary rocks. In situ, the Magnesite occurs in rude mammillated nodules. The colour is almost pure white, the hardness varies from 3 to 6, while the specific gravity is slightly under 3. The mineral, which has an earthy lustre, breaks with a conchoidal to sub-conchoidal fracture. The superior hardness of some portions of the mineral is remarkable, and might, in the absence of analysis, be accounted for by the presence of silica. Such, however, is not the case, as the following analysis will show :—

Moisture	1.32%
Al_2O_3	1.12
$FeCO_3$	1.84
$CaCO_3$	15.35
$MgCO_3$	80.83

* Read at meeting of Field Naturalists' Club, 22nd November, 1907.

From this it will be seen that the mineral is not a pure magnesite, the percentage of lime being above normal, thus probably accounting for the slight reduction in gravity which in normal magnesite ranges from 3 to 3.4.

Origin.—There can be little doubt that the mineral has been obtained from the decomposition of the augite and olivine of the basalt, chiefly from the latter, which is more readily decomposed. The lime has a probable source in the Labradorite feslpar of the same rock. The carbonic acid has been derived from the decomposition of vegetation, and this has had the effect of keeping the iron in the ferrous condition. The sesquioxide of alumina is quite free, there being no silica whatever in the specimens analysed.

A peculiar characteristic of the specimens in the occurrence on the outer surface of a pseudo-columnar structure. A delicate and very regular hexagonal pattern (the width of the hexagons varying from .5 to 1 centimetre) covers the whole outer surface, but the marking fades in a very short distance. It is hard to account for such a structure, as one would expect that if shrinkage subsequent to deposition had been the cause, the cracks would penetrate into the mineral. The usual cavities so commonly found in Dolomite occur to a small degree only in the specimens. Magnesite belongs to the Rhombohedral group of the Hexagonal system, but when crystallised it is found in rhombs owing to its perfect cleavage. The hexagonal cracks may possibly be due to incipient crystallisation.

NOTES ON ROTIFERA.

By W. R. Colledge.

1. I have found a somewhat rare Rotifer in some of the pools lately, viz., "Pedalion mirum." Thirty years ago Dr. G. Thorpe, R.N., noticed it at Dunk Island, Kennedy Bay. But I do not know that it has been seen nearer the metropolis until I found the specimens in the contents of my net. It is only the eighty-fifth part of an inch in length, and of very peculiar shape. The body is like a truncated cone. It possesses six limbs, but no two of them are alike, though all terminate in broad fan-like setæ. Its ordinary mode of locomotion is to swim by means of the cilia on the wide coronary wreath, but it frequently takes to skipping. This is effected by the sudden contraction of some of the forty-two striated muscles attached to its various organs. The effect is to project the creature often a hundred times its length in the water, and so escape from its enemies.

The possession of jointed limbs renders it an object of interest, as it brings the Rotifers near to the Crustacea.

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C. W. HOLLAND, *Hon. Sec.*

14th February, 1908.

THE

Queensland Naturalist.

THE ORGAN OF THE FIELD NATURALISTS' CLUB AND ITS BRANCHES

VOL. I. JUNE 30, 1908. No. 2.

EVENING MEETING, 10th APRIL, 1908.

Chairman : John Shirley (President).

Election : E. H. Alder was elected a member.

Reciprocity with other States : it was announced that the Club's proposal to confer the privileges of membership (except voting) on visiting members of Clubs of other States was being reciprocated by the Clubs at Sydney, Melbourne, and Hobart.

Exhibits, etc. :—By W. R. Colledge : Rotifers (alive and mounted), under the microscope. By Henry Tryon : Spine-Tailed Swift By L. C. Green : Sections of rocks under polarised light. By C. W. Holland : Stellate Scales from leaf of *Elœagnus* under the microscope. By W. R. Colledge . Appliance for displaying upper and under surfaces of insects without the risk of injury.

EVENING MEETING, 8th MAY, 1908.

Chairman : J. Shirley (President).

Election : Miss Florence Jones, Miss McMillan. and Dr. E. A. Schwabe, were elected as members.

Exhibits, etc. : —By J. Shirley : A large number of plants (all named) and geological specimens collected at Tambourine Mountain during the Easter Excursion. By S. B. J. Skertchly : A Dyak Fire-Syringe. By R. Illidge : Insects referred to in Notes on Entomology of Wellington Point. By Cyril White : Interesting Plants in Flower in the Brisbane Botanical Gardens (by kind permission of the Curator, Mr. J. F. Bailey). By R. Annear : A tooth of *Diprotodon* from the Darling Downs, and a Fossil Shell (unnamed) from Oxley.

EVENING MEETING, 5th JUNE, 1908.

Chairman : W. R. Colledge (Vice-President).

Election : T. S. Henry was elected a member.

Exhibits, etc.—By W. R. Colledge : Rotifers under the microscope. By Cyril White : Plants (classified) collected

at Sherwood. By A. Ralston: Fossil Vertebra, from Hughenden. By J. Sandison: Fossil Plants from Boggo Road, Brisbane. By C. W. Holland: Chalk idol from New Ireland and (under the microscope), specimens of Foraminifera taken therefrom.

Address: By S. B. J. Skertchly, on the Geology of Sherwood, Brisbane.

THE SPINE-TAILED SWIFT (*Chætura caudacuta*) AND ITS FOOD.*

By HENRY TRYON.

The bird on which these remarks are founded was shot by one of our members, J. O'N. Brenan, on Saturday, 28th March, at 6 p.m.

It then formed one of a party of about 100 that were flying past Toowong due north, the different individuals being widely separated from one another.

This trend of their flight is accounted for by the fact that the Spine-Tailed Swift rears its progeny in the north of the Asiatic continent.

Archibald J. Campbell, in his superb work, "Nests and Eggs of Australian Birds" in the solitary instance of the display of its nesting habit that he cites, mentions a statement on the part of a Japanese correspondent, that he had found it nesting in the deep recesses between horizontal shelves of hard rock in a perpendicular escarpment at the site of a water-fall near Yokohama.

An examination of the bird will bring to view its peculiar form, and explain its special adaptability to rapid and sustained flight.

The authority referred to intimates that no instance of its being seen settled is known to him, as far as Australia is concerned. Its peculiar tail, endowed with feathers, each of which terminates in a sharp spine, suggests that it is in the habit of perching against some perpendicular surface, either rock or tree. A quotation from Campbell, relating to its habits when at large, will bear reproduction. This is as follows:—

"A correspondent, writing from the Lower Tarwin, graphically depicts some of its habits:—'Day by day these birds are my constant companions, now swooping low along the heather, hawking in wide circles high in the air, or cutting and glancing through the thick smoke of bush fires. I see them at early dawn, while the heather is wet with dew, solitary birds skimming low along the fields. Once in a while a faint silvery twitter proves that the

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* Read at meeting on 10th April, 1908.

birds are not devoid of voice. Night closes; no sound save the low 'breathing' moan of the distant sea. Suddenly, 'swish, whiz,' past goes a Swift, cutting through the darkness with the speed of a bullet, showing the wanderer they are with him still.' "—*Op. Cit.*, p. 532.

With regarding the food that they actually partake of, I do not think that anything is hitherto definitely ascertained. Campbell says "the Spine-tailed Swift lives solely on winged insects," a fairly safe remark, seeing that, as he adds, "it has never been seen here perched." Gould alludes to it as "hawking for flies."

From the contents of the stomach, derived from the bird whose skin is exhibited, and that are before you, you will observe that its food consists in this instance almost exclusivcly of beetles, some of which are of quite large size, *e.g.*, a female example of the lucanid Lamprima. It is, moreover, remarkable that these beetles are ones of quite hard consistency: *e.g.*, weevils (*Curculionidæ*) occur amongst their number. It is stranger still that the majority comprise Coleoptera that are not on the wing save after sunset, or during the hours of the night. This applies to *Carabidæ*, *Elateridæ*, *Tenebrionidæ*, and members of other beetle families that this food comprises.

This character, then, that it presents, would suggest that the Spine-tailed Swift not only flies during the hours of darkness, as stated in the account of its habits cited, but also secures its insect diet in large part during that period of the day.

The bulk of the contents of its crop consists of beetles triturated into small fragments, and this finds its explanation in the fact that the Spine-tailed Swift is provided with a large muscular thick-walled stomach or gizzard. This being lined internally, as in gallinaceous and other birds, with a dense leathery coat. The fragments of the horny beetles evidently serve the purpose of the grit used in grinding their food, by other birds provided with a true gizzard. Two flying ants (*Formicidæ*) also entered into the components of this bird's food, and one bee-sting also was met with.

A NIGHT SINGING NATIVE BIRD.*

BY G. W. MUNRO HULL (Toowong).

Late in October last year (1906) a small grey bird made his evening camp in a camphor tree close to the house and made his presence known by repeating a most doleful lay. His song consists of eight notes given like a scale. Each note is slightly lower than the other—certainly not a tone—and the whole is peculiarly doleful and unpleasant.

This "song" was kept up intermittently all through the night. As this performance was repeated for several nights, we noted the time that he came to roost, and so regular was he in his habit that the children soon christened him "the half-past-sixer."

This regularity continued for about two months, and seldom was he ever earlier than 6.20 or later than 6.30. One evening he did not come, and again on the following evening we missed his doleful evening hymn, and soon we forgot all about him.

Judge our surprise and pleasure on the 10th of October this year (1907), at 6.50 p.m., when we heard once again the mournful tweet, tweet, tweet, tweet, tweet, tweet, tweet, tweet (slowly descending the scale) of our friend of last year, and from the very same camphor tree—there are about a dozen in the garden—and so night after night he has come home to roost, and as I write (Sunday, November 10th), he is undurdening his solitary little heart in the only song nature has given him.

I conclude he is solitary and mournful, because I have never heard his song before—and I know most of our birds—and he must be mournful to sing such a flat, inharmonious, ill-balanced lay.

I have failed in trying to see this bird, as at 6.30 the light is not strong enough to disclose him, clearly shaded as he is by the thick camphor leaves. That it is one and the same bird I feel satisfied, and it is interesting to try and picture his movements during the twelve months since he first came here. Where does he mate? What is his name? How far does he travel?

An answer to these questions would be really welcome.

I have tested the carrying power of his notes, and find that at 10.30 p.m. I could hear them distinctly at eight hundred yards approx. This is not on account of their loudness, as the notes are not loud, but they are apparently peculiarly penetrating. I have tried to catch the notes on the piano, but cannot strike them; they are

* Read at meeting on 10th April, 1908.

too flat, and the tone falls too gradually for a fixed string like a piano wire.

From a glimpse of this bird, he appears about as large as a sparrow, but thinner, and is apparently either striped or spotted in two shades of grey.

NOTES ON NIGHT-SINGING BIRDS.*

By Henry Tryon.

I cannot, from Mr. Hull's account, definitely identify the interesting songster. I am disposed to conclude, however, that it will be found to be none other than the little "Silver Eye," *Zosterops coerulescens*. This statement will appear strange to one who is familiar with its almost inaudible but distinct utterance, given vent to as it threads its way through the leafy branches of some shrub during the day. However, after sunset (and also before sunrise), when the last twitters of other members of the feathered tribe have subsided, and when it is too dark to recognise its outline even, it sings a plaintive song of great sweetness, in which the few distinct notes uttered have a definite cadence, and travel far. It is only at certain seasons of the year apparently that this happens. It has been my experience to hear the song both during the few weeks preceding and succeeding Christmas. I was awakened by the singing of the Zosterops about a week since (20th Dec.), and arose while it was still dark, although the day was about to dawn, to listen to its pleasantly modulated voice.

Other birds that sing throughout the night are Horsefield's Lark, *Mirafra horsfieldi*. This bird resembles in appearance the so-called Ground Lark (which, however, being a Pipit, is named *Anthus australis*), but has a longer tail, and this lacks the lateral white feathers of the organ as presented by the latter. Horsefield's Lark occurs about Brisbane, but I fail to recognise either its song or habits in Mr. Hull's description.

Then there is the "Shepherd's Companion," or Black and White Fantail (*Rhipidura tricolor*). This, unlike the preceding two birds, sings usually only when disturbed, and more especially during moonlight nights. I recently heard this bird singing at intervals till nearly midnight.

On the borders of the scrub lands of our coast a bird that asserts itself at a very early hour is the Yellow-breasted Robin (*Eopsaltria australis*). This has won for it the title

* Read at meeting on 10th April, 1908.

of the "Early Riser." Gould, however, has best commemorated its habit of coming forth before other scrub denizens, and at once giving voice so sweetly to its thoughts, by the technical term mentioned, by which he has designated it, and which means, literally, "Psalm of Dawn."

Finally, we have a night-songster—and a beautiful warbler—in our Australian Reed Warbler (*Acrocephalus australis*), a denizen of Southern Queensland also.

EXCURSION TO WELLINGTON POINT.

4th May, 1908.

(*a*). *Notes on Insects of the Wellington Point District.* *

BY R. ILLIDGE.

Upon leaving Birkdale Station for the walk to Wellington Point, one of the first insects to appear was the beautiful blue butterfly, *Danis taygetus*. This was in fair numbers by the roadside, where young plants of the *Alphitonia excelsa*, upon which its larva feeds, were growing abundantly, and though the leaves exhibited evidence of its presence, yet none were found, for the rapid advance of the party rather precluded that close scrutiny necessary for the capture of larvae. The little *Zizera gaika*, one of our smallest butterflies, was also noted, and to make sure, one was netted, and is now on view. Another of the lycaenids also worthy of note was *Candalides erinus*, which around Brisbane is confined to the hill tops, rarely visiting the lower grounds, but along the coast comes down to the sea level. We have taken them at the Tweed, Stradbroke, and other islands in the Bay, Noosa, and as far North as Theodolite Creek, the watering place of Childers. Two or three other lycaenids were seen, as *Zizera labradus*, *Polgommatus*, *boeticus* but being so extremely common little attention was given them.

The only Satyrids seen were *Hypocysta adiante* and *Ypthima arctous*, both common species all round Brisbane.

Of the Pierids, *Terias hecabe*, *libythea*, and *smilax* were in evidence, the first abundant. A few of *Appias ega*, *Delias argenthona*, and *nigrina* were also on the wing, likewise the Caper butterfly, *Belenois java*, whose countless swarms sometimes attract the attention of even the most thoughtless of nature.

Nymphalids were only represented by *Hypolimnas bolina* and *Junonia villida*, and Danaids by *Salatura affinis* and the large cosmopolitan *Anosia menippe*, while Hesperids

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* Read at meeting on 10th April, 1908.

appeared in *Hesperilla peronii* and the little *Apaustus sunius*.

The larger Papilionidæ were noteworthy by their absence though this was to be expected, as it is rare to see any after about mid-April.

The day-flying moth, *Agarista agricola* was observed at the Point.

As regards Coleoptera, though hardly any were captured, yet from our knowledge of larval habits, several fine insects were noted for future work amongst this family. In *Casuarina suberosa*, indications of the splendid *Stigmodera lessoni* (?) in larval state were abundantly evident. The longicorns *Uracanthus triangularis* in *Banksia integrifolia*; *Coptopterus cretifer* in *Casuarina*; *Piesarthrins marginellus* in *Acacia*; and *Phoracantha gigas* and *Tryphocharia mastersi* in *Eucalyptus*.

On the fig trees in the Wellington Point SchoolGrounds, the caterpillars of three or four species of Pyrales had been at work rolling up leaves, but the perfect insects had nearly all emerged. However, as all the species have long been familiar to us, we were not disappointed at not obtaining specimens, but for the benefit of those who may not have had a sight of these pretty insects, some are now exhibited.

Just before sun-down, some fine specimens of the blue-faced honey-eater—*Entomyza cyanotis*—visited the School Grounds, and by their loud and not unpleasant calls made themselves very much observed.

(*b*) *Notes on the Flora of Wellington Point.**

By Jos. Wedd.

It is a matter for regret that our visit was paid at an unsuitable time for making botanical collections, the small number of specimens obtained (about fifty) being by no means representative of the district. I had the advantage of living in that locality about twenty years ago, and of making collections throughout the year, so that I am acquainted with its capabilities in that respect. There are four good collecting grounds: (1) King Island and the beach providing maritime plants; (2) The white gravel ridges; (3) The swamps in which are found the carnivorous bladder worts and on the borders of which I have collected three species of *Epacris*; and (4) some distance inland, the scrubs.

Unfortunately, the time at our disposal would not allow us to visit all these; our collections were made chiefly on the gravel ridges and on the border of the creek.

Eight species of fern were collected, among them being two *Lindsaeas* and a *Gleichenia*. This is a good locality for both these genera. I have collected seven *Lindsaeas* and four *Gleichenias* here previously.

* Read at meeting on 8th May, 1908.

Only one ground orchid was collected. In the proper season at least twenty different sorts can be found, among them the large orchid *Phaius grandifolius*, *Geodorum pictum*, *Dipodium punctatum*, of which a white variety was discovered there by Mr. Kefford, and two very interesting ones, *Drakea irritabilis* and *Caleana major*. The labellum in both of these is irritable. On the slightest touch, the flower seems to turn itself inside out. These movements, no doubt, assist in the fertilization, and offer a fine field of study to those of our members who wish to emulate Darwin. Later on in the day we saw some beautiful orchids—*Cattleyas* and *Cypripediums*, from Brazil and India. Needless to say, our collecting books were not enriched, Mr. Kefford, in whose bush house they were flourishing, strangely enough preferring to see them growing in all their beauty, to having them dried and labelled as mere specimens.

An interesting plant was a small tree *Exocarpus cupressiformis*, resembling a Jacksonia, and sometimes mistaken by bushmen for a Casuarina. Its leaves are reduced to minute scales. This is the tree referred to by some people as a cherry, with the stone growing outside the fruit. The real fruit is a nut. This is the so-called stone. What is taken for the fruit is really the fleshy pedicel, which is thick, red, and succulent.

On the gravel ridges was seen a species of *Xanthorrhœa*, probably *hastilis*, so named from the spear-like appearance of the scape.

The Xanthorrhaea belongs to the order *Juncaceae*, and are a purely Australian genus. They are generally found growing on stony ridges, and are indicative of poor soil. They are diœcious. Both male and female spikes were obtained. The stems of the arborescent Xanthorrhœa appear to be wood, but the only true wood formed by this genus is a flat-bottomed cone found in the centre of the stem at the base of old tall trees. This formation may be met with two feet long, but its usual height is only a few inches. It is almost black and very hard, and appears almost indestructible, as these portions of the stem may be seen on land where the trees have been destroyed many years before. In this state they have the appearance of large turned pegs, rather than of natural growth.

The common grass tree (*X. arborea*), is a valuable plant. No one, lost in the bush, need die of starvation if there are any grass trees near. The white bases of the leaves are edible, and before the advent of the white man were used as food by the aboriginals. A useful resin is got from the tree, and it is from this yellow resin that it receives its name, *Xanthorrhaea*. This resin is used in the manufacture of picric acid. It has medicinal qualities also. If given as a powder, it stops diarrhœa, and it is an anti-

septic for wounds and ulcers. Many people earn a livelihood in the neighbourhood of Sydney by collecting the resin or "grasstree gum" as it is called. Lumps of resin are found in the dirt covering the roots. It is also collected in a wasteful way by cutting the tree down. The stem is kept in the shade for a few days, when it breaks up into sections, and it is between these the resin is found.

List of Plants collected at Wellington Point, May 4th, 1908.

Order.	*Genus.*	*Species.*
Dilleniaceae	Hibbertia	stricta
		Billardieri
Violarieae	Viola	hederaeea
	Ionidium	filiforme
Polygaleae	Comesperma	sphaerocarpum
Hypericineae	Hypericum	gramineum
Malvaceae	Sida	subspicata
Rutaceae	Boronia	ledifolia, var. rosmarinifolia
Rhamneae	Alphitonia	excelsa
Sapindaceæ	Dodonaea	triquetra
Leguminosæ	Gompholobium	pinnatum
	Daviesia	ulicina
	Crotolaria	linifolia
	Acacia	salicina
Droseraceae	Drosera	peltata
		spathulata
Umbelliferae	Trachymene	incisa
Compositae	Epaltes	australis
	Spilanthes	grandiflora v. calva
	Glossogyne	tenuifolia
Stylidieae	Stylidium	graminifolium
Goodenovieae	Velleia	spathulata
Campanulaceae	Lobelia	stenophylla
Solanaceae	Solanum	stelligerum
Serophularineae	Striga	hirsuta
Laurineae	Cassytha	filiformis
Proteaceae	Persoonia	media
		tenuifolia
	Hakea	saligna
	Banksia	integrifolia
Thymeleaceae	Pimelea	linifolia
Santalaceae	Exocarpus	cupressiformis
Euphorbiaceae	Petalostigma	quadriloculare
	Macaranga	Tanarius
Casuarineae	Casuarina	suberosa
Orchideae	Caloehilus	autumnalis
Haemodoraceae	Haemodorum	coccineum
Liliaceae	Thysanotus	tuberosus
	Caesia	parviflora

Order.	*Genus.*	*Species.*
Xyrideae	Xyris	complanata
Commelynaceae	Aneilema	gramineum
Juncaceae	Xerotes	filiformis
	Xanthorrhaea	hastilis
Filices	Schizaea	bifida
	Gleichenia	circinata
	Lindsaea	Fraseri
	Lindsaea	incisa
	Cheilanthes	tenuifolia
	Pteris	aquilina
	Polypodium	punctatum
	Blechnum	serrulatum

TAMBOURINE MOUNTAIN.*

BY JOHN SHIRLEY, B. SC.

I. General.

Travellers to Southport and the Tweed, when crossing the bridge at the Coomera River, see Tambourine Mountain as a long flat-topped mass, lying W.S.W. It forms part of the Coast Range, separating the Upper Logan basin from the basins of the rivers Pimpama, Coomera and Nerang. The mountain can be reached either from Oxenford Station, on the Southport line, or from Logan Village Station, on the Beaudesert line. From Oxenford, the mountain summit is seventeen miles distant, and from Logan Village it has recently been measured at fifteen miles. A coach carries passengers from Logan Village to Capo di Monte, a boarding house on the summit, about a mile from the northern end of the Mountain.

II. Height, Dimensions, etc.

Roughly speaking, the axis of the mountain lies along a north and south line of seven miles in length. The greatest cross diameter from east to west is two miles. The northern end is precipitous; but the southern end slopes much more gradually to the Canungera Saw Mill. Spurs run west to the trigonometrical beacon, east to Wongawallon, etc., etc. The summit of the mountain is remarkably flat, and a horseman can ride for seven miles along the main track on the mountain as easily as along an ordinary road. The greatest height is 2,055 feet. The eastern and western sides are usually precipitous. To the west the mountain is flanked by what is known as the "Cedar Shelf," the drop to the shelf, and from the shelf to the base, being by almost sheer cliffs.

* Address: Meeting, 8th May, 1908.

III. Drainage.

The western side of the mountain is drained by small creeks, running off the shelf as cataracts, like the Witch's Fall, and joining the Canungera Creek after short courses. The south-western end is drained by Sandy Creek, the upper part of which is known as The Gorge. Sandy Creek leaps over the verge at Cameron's Falls, and is usually well provided with water. The east-central and south-eastern ends are drained by Guanable and Pine Creeks, tributaries of the Coomera. At the southern end of the mountain is a gap or pass, affording a means of communication by horse or waggon from Canungera Creek to Pine Creek. The most beautiful scenery of the mountain is on Guanable Creek, at the head of which, in dense scrubs, are The Little and Great St. Bernard's Falls. The latter form a series, access to which can be obtained by means of a ladder over the cliff, and a descent through the scrub to the first fall; and a climb down a rocky slope by means of a fencing wire to the second. The third fall must be approached from below. One of the most beautiful walks on the mountain can be obtained by crossing the creek at the old bullock road above the first fall, and following it to the main road two miles below St. Bernard's. The north-eastern flank is drained by Cedar Creek, which descends from the mountain in a beautiful series of falls, called by the same name as the creek. There are also falls on a tributary called Curtis Creek.

IV. Geology.

East and west of the mountain the rocks belong to the Trias-Jura system, similar to but less recent than those around Ipswich, Walloon and Gatton. Overlying these is the great cap of basalt forming the mountain. The Trias-Jura beds are shales, sandstones and conglomerates, and as they weather much more quickly than the hard basalt, the foundations of the mountain have been cut down to vertical lines, and thus account for the precipitous sides on the east and west. Around the mountain are sandy plains with the usual foliage of oaks, wattles and gums; but the decay of the basalt has given the summit of the mountain most fertile red and black soils. The sea can be seen from almost any point of vantage on the eastern face; and this proximity to the sea causes copious rains, showers frequently occur on the summit when sunshine is seen on the plains to the west.

The basalt is often plainly crystalline, and may then be termed *dolerite*. It contains, on fracture, visible patches of a green glass-like mineral—*olivine*, and large, cross-hatched crystals of plagioclase felspar. In places it is distinctly columnar, as at the Cathedral Falls, and in the

valley of Cedar Creek. At the Cathedral Falls, too, there is a mass of tuff showing near the first fall, but this rock is rarely found.

Where the streams have cut through the basalt, the southern bank is always the lower, and has suffered most from denudation. This is the case at St. Bernard's Falls, where the northern bank of Guanable Creek is of precipitous basalt, while the southern bank is lower, more rounded, and of a baked shale or porcellanite, showing the layers, which are wavy and twisted to a curious degree. Similarly at the Cedar Creek Falls the northern bank of Cedar Creek is of precipitous basalt, while the southern is much lower, more rounded, and formed of sandstone or conglomerate.

V. The Vegetation.

The scrubs are now beginning to fall before the axe of the settler, hitherto kept out by the difficulty of marketing his goods along the wretched and precipitious roads. Citrus fruits do remarkably well, as do also plums, blackberries, and other European fruits. The purple clover grows as healthily here as in New Zealand. But the great industry of the mountain will be dairying, for which it is extremely well suited. The Jersey cattle especially do well on its summit.

In the open forest country, on the basaltic soil, besides tallow-woods, stringy-bark, blood-wood and oak, the most numerous and striking tree is Eucalyptus botryoides, the flooded gum, so common in the scrubs along the North Coast Line, yet flourishing here, at a height of 2,000 feet above the sea, as if it were near Palmwoods at nearly sea-level. The pale French-grey shining butts of this tree are beautiful, either lighted by sun or moon.

In forest country on the eastern slopes of the mountain, the commonest tree has the appearance of a wattle, with very light green leaves. This, in season, is found to be covered with yellow pea-flowers, proving it to be a Daviesia, whose allies are mostly spiny shrubs.

In the scrub, palms are numerous, especially the Pickabeen Palm, seen so commonly from the train on the North Coast Line. The lawyer canes are climbing palms, noted for their fine sprays, armed with spines like fish-hooks, as are also the fruiting clusters.

Eugenias, known as scrub cherries and rose apples, are numerous, and their fruits are a welcome sight after toiling up the slopes, from their sweet, slightly acid pulp.

Vines of all kinds knit the vegetation into a tangled mass. Many of these are the stems of grape vines, known to bushmen as water-vines, because a section of the stem, upended in a pint-pot, gives a drink of sap as clear and tasteless as good water.

It is peculiar that on Tambourine Mountain only, and at a few places on the Johnstone River, species of Chinese rice-cloth plants or Rhea fibre have been found. Do these mark ancient settlements of some superior race, afterwards exterminated by the Australian black? On Tambourine the Rhea grows along Guanable Creek, formerly it was restricted to its lower course through the scrub, now it is also found around and above the Falls.

Orchids are numerous and beautiful. On the ground, the most striking species, and one easily grown, is a Calanthe with broad parallel-ribbed leaves, and a bunch of large white flowers. Other ground orchids are purple and blotched with darker spots, flesh-coloured, sulphur coloured or white. On trees and rocks are the rock-lily or Dendrobum speciosum with its grand sprays of yellow and scented flowers; and many species of the same genus may be seen attached to the bark of trees. On rocks near the Cathedral Falls, the beautiful violet bells of Bolbophyllum Ceciliæ are much admired; and common on scrub trees are its ally Bolbophyllum exiguum, its pesudo bulbs like beads on the thread of its rhizome, each bearing a single leaf and a spray of ivory-coloured flowers.

Stinging trees of two species, and native and imported nettles are common. The cunjevoi grows near to provide a remedy for their stings.

Ferns are everywhere, from the tree-fern, whose stem may reach a height of twenty feet, to the tiny little Doodia, with its rough frond of a few inches. Elk-horn, staghorn, and bird-nest are among the most common. There are Polypodiums spotted on the back with small brown heaps of spore cases; Aspleniums with spore-cases along the principal veins; Pteris with a thin edge of spore-cases covered by a membrane along the edges of the fronds; Blechnum with spore-cases in lines along the mid-rib; and Davallia, with beautiful little shiny cups to hold them.

SCHOOL EXCURSION.

In continuation of its policy of assisting scholars to study Natural History in the field, the Club deputed a leader to attend a geological excursion, organized by the Head Master of the South Brisbane Boys' State School (Mr. J. A Briggs) on 3rd April. About forty boys, who had previously received elementary instruction in the science, accompanied by Mr. L. C. Green, M.I.M.E., etc., the Club's representative, visited the Railway Wharves, South Brisbane, where a profitable afternoon was spent in studying the geological features presented.

THE BRISBANE TERTIARIES.*

(2)

By SYDNEY B. J. SKERTCHLY (First President), Late of H.M. Geological Surveys of England and Queensland.

On May 30th I had the privilege of conducting a large party of our members over the Brisbane Beds in the vicinity of Sherwood, where certain developments of these rocks are clearly demonstrable.

The Carrington Rocks, which crop out on the foreshore of the Brisbane River, are seen to be made up of gnarled schists, and an intensely hard, highly jasperised quartzite of Permo-carboniferous, or even older date. This inlier formed a stack of skerry in the wide shallow lagoons of the Jura-trias era, and as its form can still be clearly made out, I call it the Sherwood Skerry. It rose to a pinnacle at the northern end, and in Tertiary times, this pinnacle was much broken up by weathering, and its slopes are still covered with a very remarkable scree, quite unlike that produced by present atmospheric agents upon these rocks. I incline very strongly to look upon this scree as due to frost action. It has been preserved under the lee of the pinnacle by having been covered with other Tertiary beds and basalt, mostly now removed. Its exact relation to the beds next described is not visible, owing to a modern gully having cut along the junction.

Across this small gully we came upon the striking gravel and shingle beds, which, had they occurred, say, in Scotland, would have been looked upon as typical gravelly "till." In it large and small stones, sand and clayey matter, are jumbled up, and sometimes the long stones up-ended in a way that precludes any suggestion of ordinary stream action. I shall speak of these as the Higeldy Gravels, in honour of my old friend, Amund Helland, the eminent Norwegian glacialist, who saw in "higgledy-piggledy" (pr. high-geldy), a rare and precious technical term. These Higeldy Gravels become surface-hardened into a spurious conglomerate, and as we saw, underlie most of the low alluvial ground from Rocklea to Indooroopilly Bridge. Here and there, and by no means rarely, great erratics, weighing several hundredweights in certain cases, lie in the gravel. They are of the jasperised quartzite mentioned above, of the volcanic agglomerate belonging to the base of the Jura-trias, and of the schist, and none need have travelled more than a mile or so.

* Address: Meeting on 5th June, 1908.

Some of them show that since "grounding" they have had their exposed upper surface battered into rounded forms and incipient potholes by the passage of smaller stones over them. I can imagine no agent save floating ice transporting such heavy masses. (See my notes in last number).

We also examined the remains of the olivine basalt (late Tertiary), which once covered a great portion of the Brisbane Tertiaries. It is almost destroyed, and has weathered into a clayey magnesite, white and greenish, but in places the old spheroidal structure can be made out and the vesicular character of the original rock.

I find the Tertiaries much more continuous and widely spread than I at first thought likely. They seem not to be more than, say, sixty feet thick. The provisional arrangement of the beds is as under :—

Table of Strata.

Recent.

Alluvium of Brisbane R., etc., in three Terraces.

Tertiary.

(A. Neogene).

Basalt, olivine ; much decomposed into Magnesite, etc.

B. Eogene.

Brisbane Tertiaries.

1. *Mottled red and grey Marls and Brickearth* ;
2. *Fine White sand*, with carbonaceous markings ;
3. *Plant Beds*, fine-grained whitish marly sands, often very finely laminated ;
4. *Sandstones*, not very compact ; hardening on exposure ; passing into grits ;
5. *Sherwood Skerry Scree.* ;
6. *Higeldy Gravels, with Erratics*, becoming almost conglomerate on exposure. Not water-sorted.

Mesozoic.

Ipswich Beds. Pale shales with Tæniopteris, etc. Massive sandstones, grits and conglomerates, with beds of volcanic agglomerate near and at the base.

Palæozoic.

Gympie Beds. Schists and Quartzites.

The Brisbane Tertiaries lie unconformably upon the older rocks, overlapping from the Gympie across the Ipswich from its base to quite high up in the series.

NOTES ON ROTIFERA.

No. 2.

BY W. R. COLLEDGE.

A beautiful and unique Rotifer exhibited at the April Meeting was *Trochospœira æquatorialis*. It was first seen by Professor Semper in the pools of the rice swamps, in the Phillippine Islands, and seems only to be found in the tropics at certain times of the year. Some specimens have appeared here recently. They are transparent globes about one-thirty-sixth of an inch in diameter, so delicately formed that often portions are only visible in certain lights. Around the centre a line of cilia runs, dividing it into two parts, hence the name "*Trochospœira æquatorialis*." At one part of the girdle, is a nerve ganglion, bearing a minute eye. Further round you find the mouth, adorned with a slender moustache of cilia. When these vibrate, they cause a current of water to pass into the interior, bearing spores and other food particles. These are brought within the range of the tiny jaws, which prepare it for the tubular stomach; two little pouches attached to the upper part of this organ secrete digestive juice, and their contents intermingle to aid the process of digestion. Other organs hang on the sides of the minute balloon. The ovary, like a curved ribbon, floats in the cavity, being partially retained in position by the tube of the oviduct, which is anchored in the cloaca. In some specimens one or more eggs are seen, and occasionally a curious structure is found, consisting of a central sphere, with long spikes projecting from it. In others a membrane is thrown round the spike tips, so that it looks like a little wheel with spokes and tire complete. I fancy it must be a resting egg or spore. Few objects are more beautiful under the microscope; when shown on dark ground, they seem like silvery globes revolving in space.

FIELD NATURALISTS' CLUB, TOOWOOMBA.

For some little time past a movement has been afoot to form a Field Naturalists' Club at Toowoomba, the capital of the Darling Downs, to which city the Club made an excursion in November last. The movement culminated in the successful formation, on 4th April, of a Club with the following office-bearers :—President, Dr. R. Hamlyn-Harris, D. Sc.; Vice-Presidents, Miss Hunt, B. Sc., and Mr. W. T. Gray; Committee: Miss Thompson, Messrs. P. Forsyth, H. A. Longman and J. Spiers; Hon. Secretary and Treasurer, Mr. Frank Burtt. We welcome the advent of the new Club, which has affiliated with the Brisbane Club, and which we wish every prosperity.

THE

Queensland Naturalist.

THE ORGAN OF THE FIELD NATURALISTS' CLUB
AND ITS BRANCHES

VOL. I. SEPTEMBER 30, 1908. No. 3.

PROCEEDINGS.

EXCURSION, 27th JUNE TO JULY, 1908.

Caloundra: Twenty members present. L. C. Green, G. Gross, and J. Johnston acted as leaders. Marine zoology (conchology especially), and botany claimed the attention of those present.

EXCURSION, 18th JULY, 1908.

Sandgate: Eleven members present. L. C. Green acted as leader.

EVENING MEETING, 24th JULY, 1908.

Chairman: J. Shirley (President). *Attendance*: Twenty.

Election: J. T. Sandison, Victoria Pottery, Ipswich Road.

Lecturette: By the President, on Marine Mollusca, with lantern illustrations.

Exhibits: The infusorian animal, *Vorticella epistylis*, displaying structure, etc., by W. R. Colledge; Shells collected at Caloundra, by Mr. G. Gross; Teeth of the extinct marsupial *Diprotodon*, by L. C. Green; Teeth of the same and of *Nototherium*, by G. F. Bennett; Jaw-bone of *Ichthyosaurus*, from Hughenden district, by A. Ralston.

EXCURSION, 8th AUGUST, 1908.

Sankey's Scrub: Eighteen members present. Messrs. J. Wedd and C. White (Botany); R. Illidge (Entomology); H. Tryon (Ornithology) acted as leaders.

EVENING MEETING, 14th AUGUST, 1908.

Chairman: W. R. Colledge (Vice-President). *Attendance*: Eighteen.

Election: H. J. Massey (Miss), Louisa Street, Highgate Hill.

Correspondence: From Advisory Committee, Fisheries and Game Acts, Victoria, inviting support of the F.N.C. in its efforts to secure the protection of certain native birds by prohibiting the export of egrets, etc. The Committee's sympathetic attitude towards the proposed action was approved.

Reports: On the Plants observed during the excursion to Sankey's Scrub, 8, viii. 8, by C. White*; On the Birds observed during the excursion to Sankey's Scrub, by H. Tryon*.

Papers and Notes: "List of Insects collected in one day at Bulimba," by R. Illidge*; "The occurrence of Diatomaceous Rock at Canungra and Gatton, S. Queensland," by H. Tryon*; "Glimpses of the Cairns fern world," by H. Tryon*.

Exhibits: Insects procured at Sankey's Scrub, by R. Illidge (illustrating report); Plants procured at Sankey's Scrub, by C. White (illustrating report); Insects from Bulimba, illustrating note, by R. Illidge; Diatomaceous Rock, collected by Mr. R. W. Lahey, at Canungra, and by Geol. Survey Dep., at Gatton, by H. Tryon; Ferns from Cairns District, by H. Tryon; Japanese Books, displaying great perfection in artistic illustration, by J. Skertchly; Marsupial Animal (*Phascogale penicillata*), for Mr. Lahey, by H. Tryon*.

EXCURSION, 12th SEPTEMBER TO 14th SEPTEMBER, 1908.

Bulwer, Moreton Island. Fifty-one members were present. The Honourable the Treasurer kindly lent the steamer "Champion" for the trip.

For Reports on work accomplished *vide Transactions*.

EVENING MEETING, 18th SEPTEMBER, 1908.

Chairman: W. R. Colledge. *Attendance*: Twenty-five.

Election: W. Weatherill, Queensland Museum, Brisbane; Miss C. Jackson, Corinda.

Correspondence: The Local Committee, Australasian Association for the Advancement of Science, inviting nomination of a delegate to the *Section* Biology. It was

* Vide Transactions.

announced that the Council had accordingly nominated Mr. C. W. Holland, Hon. Sec., etc., and the meeting confirmed its action.

Reports : (1) On the Insects collected during the excursion to Moreton Island (12, 14-8), by R. Illidge* ; (2) On the Fish collected during the excursion to Moreton Island, by Mr. D. Ogilby* ; (3) On the Birds collected during the excursion to Moreton Island, by H. Tryon* ; (4) On the Marine Shells, etc., collected during the excursion to Moreton Island, by H. Tryon* ; (5) On the Plants collected during the excursion to Moreton Island, by C. White.*

Notes Supplementary to (1), relating to the Insects collected by Messrs. H. Tryon and E. Jarvis, were held over.

Paper : " Description of a New Pseudogerygone from South-east Queensland," by W. E. Weatherill*.

Lecturette : By Mr. H. Tryon, on the Siphonophora *Physalia and Velella*, illustrated by drawings and by specimens [Portuguese Man of War]—the latter from Moreton Bay.

Exhibits : (1) Insects obtained during excursion to Moreton Island, by Mr. R. Illidge ; (2) Insects obtained during excursion to Moreton Island, by H. Tryon and E. Jarvis. (Including an example of a butterfly previously unknown as occurring in Queensland—*Mesodina halyzia* [Lycænidæ]) ; (3) Marine Shells obtained during excursion to Moreton Island, by H. Tryon ; (4) Fulgurites, Iron Sand, etc., obtained during excursion to Moreton Island, by H. Tryon ; (5) Plants obtained during excursion to Moreton Island (held over) ; (6) Preparations, illustrative of the tinctorial principle contained in the mollusc, *Ianthina*, furnished by Moreton Bay specimens, by F. Smith, B. Sc. ; (7) Dissection of Typical Insects for nature study purposes, by E. Jarvis ; (8) *Gerygone cantator*, sp. nov., birds, nest, and eggs, by E. Weatherill.

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* Vide Transactions.

TRANSACTIONS.

LIST OF PLANTS SECURED DURING SANKEY'S SCRUB EXCURSION.

By C. White.

Ranunculus parviflorus, *Linn var.* australis (Ran,) ; Stephania aculeata, *Bail.* (Menis.) ; Hibbertia diffusa, *R. Br.* (Dill.) ; Citriobatus pauciflorus, *A. Cunn.* (Pittos.) ; Linum usitatissimum, *Linn.* (Lineæ) ; Vitis hypoglauca, *Fr. M.* (Ampel.) ; Oxylobium scandens, *Benth.* (*Leg.*) ; Oxylobium aciculiferum, *Benth.* ; Jacksonia scoparia, *R. Br.* ; Daviesia ulicina, *Sm. var.* augustifolia ; Daviesia squarrosa, *Sm. var.* villifera ; Pultenæa retusa, *Sm.* ; Pultæna villosa, *Willd.* ; Hovea acutifolia, *A. Cunn.* ; Hardenbergia monophylla, *Benth.*; Kennedya rubicunda, *Vent.* ; Acacia linifolia, *Willd.*; Acacia longifolia, *Willd.* ; Acacia Cunninghamii, *Hook.* ; Acacia aulacocarpa, *A. Cunn.* ; Eucalyptus acmenioides, *Schau* (Myrt.) ; Monotoca elliptica, *R. Br.* (Epac.) ; Carissa ovata, *R. Br.* (Apocyn.) ; Alyxia ruscifolia, *R. Br. var.* pugioniformis ; Alchornea ilicifolia, *Mull. Arg.* (Euphorb) ; Pterostylis nutans, *R. Br.* (Orchid) ; Acianthus fornicatus, *R. Br.* ; Cyperus lucidus, *R. Br.* (Cyper.) ; Adiantum æthiopicum, *Linn.* (Filices) ; Adiantum hispidulum, *Sm.* ; Pteris aquilina, *Linn. var.* esculenta ; Pteris tremula, *R. Br.*; Doodia aspera, *R. Br. var.* media. ; Aspidium decompositum, *Spreng* ; Polypodium punctatum, *Thunb.* ; Polypodium rigidulum, *Siv.*

ON BIRDS OBSERVED DURING THE EXCURSION TO SANKEY'S SCRUB, 8th AUGUST, 1908.

By H. Tryon.

About an hour's sojourn at a much-frequented picnicing spot nigh the town at a time of day when birds are quietly seeking their evening meal, does not constitute the conditions most favourable for gaining acquaintance with them, especially when one is a member of a party. Some birds may, however, be encountered even under these circumstances.

Several Magpie Larks or "Peewit" (Grallina picata) asserted themselves by their sprightly movements and shrill utterance. They were accompanied in the open pastures by the familiar Willy Wagtail (*Sauloprocta motacilloides*). It is interesting to note, that, thanks to the

advocacy of the claims of our useful birds for protection in our primary schools, these two species promise to become more numerous than of late. Two of our most elegant, peaceful Doves (*Geopelia tranquilla*) were seen also feeding on the bare ground beneath standing timber. Walking along the creek that traverses the scrub, but in an opposite direction to the latter, were seen several little bands of Silver Eyes (Silvs) (*Zosterops cœrulescens*) flitting hurriedly through the branches of the various eucalypts, or exploring their leaves for insects. Another little bird—whose lond notes uttered in series of threes, with an emphasis on the third, strangely contrasted with the faint twitter of the last—performed various gymnastic feats searching the foliage too of these trees in quest of lerp-insects.

Flying eagerly from tree to tree, and hurriedly running along the smaller branches, was a beautiful little bird, bright russet green above, save for a black cap, and a brown white collar, and snowy-hued beneath. This was the *Melithreptus albigularis* or White-Throated Honey Eater, and occurred in two and threes, rendering the woods vocal with its varied notes. Less commonly in the same situation was seen another Honey Eater—a *Ptilotis* (? *Sonora*).

Suddenly from a tall tea-tree (*Melaleuca*) arose a sound as if produced by striking small glass-marbles together rapidly, but interruptedly. This was recognised as the alarm note of that beautiful Yellow and Gray Robin : *Eopsaltria australis*.

Inquiring into the origin of its trepidation, it was found to be occasioned by the presence of the Boobook Owl (*Ninox boobook*) in the denser foliage of the tree. Owls are usually regarded as entirely serviceable creatures, through their habit of consuming mice and other small rodents. The Boobook Owl, however, derives its food in a great measure from the members of its own tribe : the small birds holding it in especial dread. Of course, the Eopsaltria belongs to the Shrike family, and is somewhat aggressive itself. A relation of it, the Red-breasted Robin (*Pachycephala rufiventris*), that delights so many a Brisbane resident with its beautiful song—loud, but sweet—and sometimes reproduces the utterance of the Coachwhip Bird in lesser volume of sound, was serenading its mate at no distance away. And flitting amongst the boughs of a small tree, spreading its ample tail that it moved from side to side at its resting place, and dropping suddenly as a winged-insect approached, to as quickly regain its perch again, was that lively little creature, the White-Shafted Fly-Catcher (*Rhipidura albiscapa*) that finds its winter with us here.

Visiting in succession the angle where a large branch joined the trunk of the tree from which it sprung, were several

large birds with long wedge-shaped red beaks and dark-streaked breasts. These were examples of one of our fruit eaters, the Green Oriole (*Mimeta viridis*), and were engaged in quaffing the water that had been caught in the hollow that this situation yielded. One often wonders how birds that do not resort to the ground obtain their drinking material. As we departed, a Fan-Tail Cuckoo bade us adieu with its many clear, far-sounding notes of one pitch, repeated with great regularity.

INSECTS COLLECTED IN ONE DAY (21st JUNE, 1908) IN THE BULIMBA SWAMPS, NEAR THE BRISBANE RIVER.

By R. Illidge.

Bright warm day; showers during night preceding; wind, northerly after mid-day:—

Rhopalocera—observed or captured.
Salatura affinis—one only seen.
Anosia menippe—several in good condition; noted also larvæ
Chanapa corrina—abundant.
Junonia villida—not common.
Pyrameis itea—one specimen seen.
Hypolimnas bolina—several ♂ and ♀ in fine condition.
Neptis Shepherdi—several specimens .
Melanitis leda—several in fine condition.
Danis taygetus—many; took three ♂ with white in fore-wing.
Candalides margarita—one ♀ taken; several seen.
Nacaduba ancyra var. florinda—several taken; all ♂s.
Nacaduba lineata—many about; three pairs captured.
Nacaduba palmyra—one ♂ of this rare insect seen flying about loranthus.
Nacaduba dion—a few noted, but not plentiful as on a previous occasion (7th June).
Nacaduba berenice—abundant; ♂ and ♀s taken.
Nacaduba dubiosa and felderi—not uncommon; netted a few specimens of each, but they were very wary and difficult to get at.
Ogyris amaryllis—several seen in usual haunts.
Terias hecabe—abundant.
Terias libythea—several.
Terias smilax—one specimen only.
Elodina angulipennis—abundant.
Elodina parthia—scarce; plentiful on 7th inst.
Belenois java—not so abundant as usual.
Huphina perimale—winter forms in fair numbers about.

Appias ega—several, mostly ♂s; took a pair.
Delias argenthona and Delias nigrina—both plentiful; did not bother to net any.
Delias nysa—many about, but appeared worn; captured one with sub-marginal spots of hind wings almost obsolete.

No Papilios or Skippers were seen, and the ubiquitous Acraea andromacha and Pyrameis kershawi were absent. Coming home up the River in the boat specimens of D. argenthona, nigrina, and nysa were noted flying over, and an occasional lycaenid butter-fly, which could not be identified with certainty.

THE OCCURRENCE OF DIATOMACEOUS ROCK IN SOUTH QUEENSLAND.

By H. Tryon.

The Diatomaccous Rock, exhibited on behalf of Mr. R. W. Lahey, came from the vicinity of Canungra Creek, S. Queensland.

It may be described as a soil-stained, opaque mass, of a dull, pure white colour, of very fine clay-like structure, adhering to the tongue, readily scratched by the nail, and so light as to float in water. This was met with in masses outcropping on the side of a high hill.

With regard to this exhibit, I have on several occasions seen specimens of this from the Logan District, and finding that it contained alumina, without special examination, regarded it as Cimolite, and, in fact, a small specimen apparently identical with it was so-labelled in the Museum of the Geological Survey. A block of it displayed at the same institution was labelled *Tripolite*. This, it was learned, was derived from a deposit occurring beneath basalt, and above the Ipswich sandstone at a spot near the rear of Nerang Creek, on the eastern side of Beach Range, a spur of the Macpherson Ranges.

The label referred to also contained the following analysis of the specimen that had been made at the Government Analyst's Laboratory :—

Tripolite from Beach Range, S. Queensland.

Silica	86.0
Iron—$Fe_2 O_3$; Alumina, $A_2 O_3$ ..	5.2
Lime-Cao	0.5
Water at 100 degrees C.	4.6
Loss on Ignition	4.1
	100.4

The Museum contained further examples of a similar earthy mineral from Woodbine, near Gatton. A sample of this I have received through the courtesy of the Geolog. Survey Office, and now exhibited. This also had been analysed at the Government Analyst's Laboratory; the analysis being as follows:—

Tripolite from Woodbine, near Gatton, S. Qld.

Silica insoluble	7.6	83.8
Silica soluble	7.8	
Alumina	5.1	
Iron	traces	
Magnesia	0.8	
Lime	Nil	
Loss at 115 degrees (water)	5.5	
Loss at Red Heat (water)	5.8	
	100.8	

I have also received from the source wherever the last mentioned specimen was derived, a pale grayish brown example of the same mineral from Nerang, which is also submitted.

On examining the specimen received from Mr. Lahey, as also that from Woodbine, Gatton, I find that both contain diatoms of more than one kind in very large numbers, and that microscopical investigation confirms the conclusion based on chemical composition.

The analysis indicates that clay is present in small proportions only, which at once forbids its being associated with the argillaceous Cimolite.

To Mr. W. R. Colledge has been given specimens for more precise microscopical examination, and his observations should lend great interest to the exhibit.

GLIMPSES OF THE CAIRNS FERN WORLD.

By H. Tryon.

The fern-specimens exhibited were secured during a ramble of a few hours' duration in the Mountain Scrub at Hambledon, near Cairns, in July of the present year. They are representative of those more commonly met with growing in or near the soil there, but do not however embrace any examples illustrating the tree-ferns. Doubtless, a more prolonged search over a wider area would reveal many more fern-species growing in the district, but those shown will illustrate what opportunity the local student has for studying the interesting class of plants they represent, and what a rich supply of ferns the Cairns scrubs

yield the cultivator of these beautiful plants. They are as follow :—

(1) *Marattia fraxinea*, Smith. The portions of fronds, that I owe to the courtesy of J. F. Bailey, will exhibit the distinctive features of Marattia and Angiopteris. The examples in mind of this plant were growing on level, damp creek-sides ; specimens were not retained for reference. Possibly, their examination would have indicated Angiopteris. I also bring under notice a fossil, a portion of the extinct Macro-tæniopteris, to show that the *Marattiæ* and it exhibit the same type of venation.

(2) *Trichomanes.*

(3) *Trichomanes pyxidiferum.*

(4) *Trichomanes rigidum*, Sv.

(5) *Lindsœa cultrata*, Sv.

(6) *Adiantum œthiopicum, Linn.*

(7) *Adiantum diaphanum*, Blume. This delicate maiden hair fern where growing in the district is usually endowed with three simple primary pinnæ, and when covering steep slopes has a very beautiful appearance. Some of the luxuriant fronds shown have a higher development of the primary divisions.

(8) *Adiantum hispidulum. Swartz.*

(9) *Pteris geranifolia.* This diminutive representative of its genus is apparently rare, but its humble appearance doubtless leads to its being often overlooked.

(10) *Pteris quadriaurita, Retz.* This delicate, pale-green, most elegant fern is remarkable for the possession of a secondary pinnæ on the basal primary, one on each side. This feature is very early manifested, as will appear from the young fronds shown.

(11) *Doodia aspera.* Perhaps the most familiar of our Brisbane ferns, but exhibiting a very luxurious growth in northern specimens.

(12) *Asplenium maximum, Don.* This plant has the habit of a miniature tree-fern, with its black coloured erect rhizome. When growing in the beds of creeks—its usual habit—its much divided fronds, measuring 2ft. 3in. in length, produce a beautiful effect.

(13) *Aspidium ramosum, Beauv.* A fern climbing up the trunks of trees ; remarkable for having its pinnæ articulated to the rachis, as in Potypodium tenellum.

(14) *Aspidium molle, Swartz.*

(15) *Aspidium confluens, Met.* A remarkably handsome fern, the reticulate variation of the leaves being noteworthy.

(16) *Polypodium tenellum.* This handsome fern with its long fronds and simple pinnæ is becoming quite a common object in our Brisbane shade-houses.

(17) *Polypodium pallidum, Brackenbridge.* Perhaps the most beautiful fern of the scrubs. Its pale yellow-green, lace-like foliage rendering it a lovely object.

(18) *Polypodium pœcilophlebium, Hook.*

(19) *Polypodium irioides, Poir.* Forms in some places dense masses. The peculiar manner in which the sori are densely disseminated over the leaf-surface is a remarkable feature.

(20) *Polypodium acrostichoides, Forst.* This is really an arboreal fern coming to the ground with detached branches. Its turgid simple leaves are very tolerant of dry conditions under which it grows, remaining fresh for many days; the stellate hairs covering its under, and in part its upper surfaces are noteworthy.

(21) *Antrophyum reticulatum, Kaulf.* Growing on damp rocks, attaining a length of a foot or more. Its sori forming a network (opposite to the nervures) are remarkable.

(22) *Acrosticum repandum, Blume.* A fern whose thick, dark-green, slim foliage renders it a most conspicuous object.

BRUSH-TAILED *PHASCOGALE*

(Phascogale pencillata).

From Canungra. Exhibited by Mr. R. W. Lahey.

This small marsupial belongs to the family Dasyuridæ. It is an animal not frequently seen on account of its nocturnal life, extreme agility, and habit of climbing trees and running swiftly along their boughs.

Its teeth, the molars 4 in each jaw above and below, being studded with prickly tubercles, suggest an insectivorous diet. Krefft, however, though silent on this point, mentions its adeptness in capturing and consuming small rodents (mice). It is often credited with being very destructive in the hen-roost, and although this reputation is, according to the naturalist mentioned, unmerited, that it preys on small birds is a fact well established.

Although, as stated, it is a marsupial, it lacks a pouch—8 mammæ are, however, present.

It has been long known, although rare, as above-stated, White having described it over a hundred years since (1798).

"Like all other members of this group (Dasyuriinæ)," Krefft writes, "It is in the habit of folding down the ears, which are very seldom carried erect."—*Mammals of Australia*, 1871, p. 2.

EXCURSION TO BULWER, MORETON ISLAND, 12th-14th SEPTEMBER, 1908.

(*a*) ENTOMOLOGY.

Leaders.—R. Illidge, Edmund Jarvis, and H. Tryon.

Notes on Insects collected.—The floral wealth of Moreton Island at Bulwer might imply an equally rich insect fauna, and that it actually does so was abundantly proved by the specimens obtained in the short period during which the collecting herein alluded to was prosecuted.

Lepidoptera.—Of Butterflies, the first to come under notice was Hypocysta adiante, several examples of which were taken considerably larger than Brisbane forms. Another worthy of notice was Una agricola, an extremely rare species in the environs of the city, but found to be fairly common at Bulwer, flying low amongst the small flowering bushes at the lesser elevations. A trip to the summit of the sandy hills at the back of the settlement proved the existence there of other Brisbane rarities also, *e.g.*, Candalides hyacinthina, and C. acasta; as well as the common but beautiful C. xanthospilos. Another scarce species observed was Ogyris abrota. In addition to these five lycænids, occurred the common skippers Hesperilla peronii and Apaustus sunnias, and one which southern entomologists are familiar with, Mesodina halyzia. This insect, of which a single individual was captured by E. Jarvis, has not previously been met with in Queensland.

Moths were represented by several of the Hydromenidæ that frequent dry situations, and that doubtless receive protection from their dull and inconspicuous colouration, *e.g.*, Hydromena serrata, Cosymbia rupicola, and Nearcha spp. Several species of Œcophoridæ were particularly abundant too, notably Philobota arabella, P. xanthiella, besides others. A supply of the pieces of the wood of Exocarpus cunninghamii, containing the tunnelling caterpillars of a very beautiful xyloryct moth—Xyloryeta porphyrienella, the colours of which are cream yellow and purple—were obtained. Grass-tree scapes (Xanthorrhæa) yielded caterpillars of a giant Galleriad moth, belonging to the genus Aphomia, with large uniformly clay-coloured forewings. A pretty day flying moth (Phalænoides polystieta) was fairly common. A very good specimen of a

large moth, Danina banksiæ, was caught and presented to us by a "botanical" friend. The caterpillar of this is a beautiful but voracious being; found feeding upon the Banksia.

Coleoptera.—It was not until a little patch of Leptospermum—just coming into flower—was met with that Beetles came prominently under notice: Its blossoms soon yielded several little Buprestidæ of the genus Stigmodera, and some Cleridæ of the genus Eleale; various Malacoderms; and a solitary longicorn, belonging to the peculiarly interesting genus, Hesthesis, the members of which are extremely wasp-like in appearance. A pretty beetle—Stigmodera crenata—a miniature edition of S. octospilota of Sydney, was also met with on the white flowers of Conospermum taxifolium. On a bright yellow-flowering leguminous shrub—Phyllota phylicoides—many specimens of a bronzy gold Melobasis (Buprestidæ) were taken also; these being difficult, however, to detect, as their colours harmonised so well with the colours of sepals or petals, according to the point of view of the observer.

Hymenoptera.—Amongst bees a shining blue-green wood-boring species, Lestis bombylans, was not uncommon about dead timber; captures included female specimens, however, only. Diminutive Andrenidæ of the same colour, as well as black-coloured species, resorted thickly to the flowers of Xanthorrhæa. Again a dark-coloured bee, with white bars on its pointed hind-body, a species of Cœlioxys was procured. This possesses the peculiar feature of approaching in appearance a leaf-cutting bee, Megachile, whilst it also presents us with an instance of parasitic habits. Hovering about rotten wood were also seen examples of the remarkable evanid genus Gasteruption, recognisable in possessing a long curved hind body, springing obliquely upwards from almost the level of the wings. Thynnidæ were too plentiful, but only examples of two species of these were secured; minus the wingless females, in each case.

Diptera.—Many varieties of these occurred. The few collected comprised examples of large and handsome species of three genera of Bombylidæ.

Neuroptera.—Dragon-flies were numerous, and as regards both individuals and species. The most conspicuous was a large insect having dark brown conjoined patches at the base of the ample hind-wings—Tramea Loewii; the least was a diminutive insect having a wing expansion scarcely exceeding an inch, common amongst the herbage of the swampy flats, and named Nannodythemis australis. Most prevalent were a Trithemis, having a yellow suffusion at the base of each wing, and a species of Lestes (Agrionidæ)—the "Blue Demoiselle." Examples

of the remarkable Bittacus australis (Panorpidæ) were well in evidence, individuals being all busily at work "scooping up" small moths, and sucking their juices (*vide* "Notes on the Scorpion Fly—Bittacus australis" by Edmund Jarvis.—*Victorian Naturalist*, xxv, 4, p. 69-71, 1908).

Hemiptera.—Members of this group were not, as a rule, collected. On some small trees of Exocarpus Cunninghamii occurred a handsome plant-bug, whose colours are of the darkest green and pale-yellow, with a white bar crossing the fore-wings—Comnius elegans, and specimens also were secured of the peculiar predaceous Pristhesanchus papuensis—that will wound the hand of the unwary. A small cicadid, Melampsalta (? incepta), was also common.

Orthoptera.—The large Acridium maculatum; the red-legged Cirphula pyro-cnemis; two species of Epacromia, reproducing in each case the appearance of dry twigs when settled; and Tropinotus australis, were the Grasshoppers most prevalent. A peculiar Locustid of unusual habits was also collected. This was green coloured, with the dorsum of the prothorax rich-brown, and had pink and blue mandibles. It was engaged in devouring a bee, when captured. The colours of this particular insect (? Xiphidium sp.) evidently fit it for an arboreal and diurnal existence; those Locustidæ, with which obviously it is nearer related, and which live in holes in the trees or in the ground, whence they come forth after nightfall, to devour their prey, being sombre hued. However, a remarkable Locustid of nocturnal habits was as well discovered. This was a peculiar brownish-coloured insect named *Prochilus australis*, the type of a small family met with nowhere else than in Australia. It was encountered on the upper part of the caudex of a grass-tree, beneath the dry foliage. It had a wing expansion of $2\frac{1}{2}$ inches, and a body length of $1\frac{3}{4}$ inches, the latter terminating in a sword-like ovipositor. Strange to relate, it in some respects resembled a small Phasmid insect; for its narrow elongated wing covers and its membranous closely barred hind-wings reproduce the one the appearance of the opaque portion, and the other that of the transparent one, of the wings of certain of the smaller members of this order. Its captor, Edmund Jarvis, observed that when at rest its wings were folded beneath its tegmina, and that these four organs thus disposed were directed upwards from the thorax, having the similitude of a small branchlet attached to a larger one, represented by its dull coloured body. These remarks are based exclusively on the work of the leaders in Entomology.—R.I. and H.T.

(*b*) ICHTHYOLOGY.*

1. *Sardinella neopilchardus* (Fam. Clupeidæ). Australian Pilchard.
2. Pseudo-Upeneus Jeffii, *Ogilby* (Fam. Mullidæ). Jeff's Red Mullet.

   This is the largest specimen that has been received, being 230 mm (9.2 inches) long.
3. Epinephalus fasciolatus, *Forskal* (Fam. Percidæ). Black-tipped Rock Cod.
4. Not recognised from description (Fam. Percidæ). Has the contour of Ctenolates or Scolopsis.—H.T.
5. Dentex filifer, *Castelu.* Not as a rule found in Moreton Bay waters.
6. Scorpæna cruenta, *Richardson* (Fam. Scorpænidæ). Coral Cod.
7. Sparus australis. Bream. (Fam. Sparidæ).

With reference to No. 1, the following note by Mr. Ogilby is submitted :—

"AUSTRALIAN PILCHARD."

"Some years ago I reported, in the columns of the *Observer*, the presence on our coast during the winter months of large shoals of two small herring-like fishes—the blue sprat (Stolephorus robustus) and the silver sprat (Hyperlophus copii), both originally described by me from specimens taken in the neighbourhood of Port Jackson. These two fishes, as I then pointed out, are of great economic importance to the State as contributories to the manufacture in our midst of sardines and smoked sprats of the very highest quality. At the time when I made the above announcement I predicted that a much more important species—the Australian pilchard (Sardinella neophilchardus)—would eventually be found to visit our seas annually, as it has long been known to arrive at stated seasons on the coasts of New South Wales and New Zealand. I am happy to say that I am now in a position to verify this prediction, as the following brief narrative will show :—During last week end a party of the local Field Naturalists' Club visited Moreton Island for a three days' trip, and one of the party, Mr. W. Weatherill, on his return to the Museum on Tuesday, brought with him three of the large yellow-billed terns(Sterna bergii). When he had skinned them we examined the contents of the stomachs and found that they had been feeding solely on a harengid of considerable size, one specimen which would have measured when entire about 7in. being in such a perfect state of preservation as to be easily

* The fish—with the exception of No. 1—were limited to those taken with hook and line by S. T. Jackson. Descriptions of these were afterwards submitted to the well-known ichthyologist, Douglas Ogilby, to whom the Club is beholden for these identifications and notes.

recognisable as our pilchard. The fact that of the hundreds of these birds in the flock from which the three were shot those procured all contained examples of Sardinella proves that these valuable fishes must now be present in large numbers in our shores."

[*Note.*—Mr. D. O'Connor, of Oxley, commenting on this note, narrated an interesting experience in Victoria during the 60's. A large shoal of fish appeared off the coast, in the latitude of Melbourne. This, passing Port Philip, went in at the "Rip," and was so vast that the people, observing it, scooped out the fish from the water in bucketfulls; and sufficient were captured, not only to supply local wants, but also to furnish Ballarat with truck-loads thereof. Residents who were familiar with the fisheries of Cornwall, being natives of that county, styled these fish pilchards. Never had so many been seen in this Southern locality before.—H.T.]

(*c*) ORNITHOLOGY.

Leader: W. Weatherill.

Birds of Prey.

1. White-bellied Sea Eagle (Haliætus leucogaster. *Gmelin*). This was seen soon after entering Moreton Bay, after leaving the Brisbane River.
2. White-headed Sea Eagle (Haliastur girrenra, *Vieillot*). Observed more than once flying over the level portions of the island, displaying the rich chestnut colour of its back, which when shone upon is seen at an immense distance.
3. Boobook Owl (Ninox boobook, *Lath.*). Heard on the evening of our arrival, but not seen.

Corvidæ.

4. Crow (Corvus coronoides, Vig. et Horsf.). Several of these were noticed. In one instance a small flock of 4 or 5 were seen flying over the sea adjacent to the land, as if in the quest of dead fish or other animal matter cast up by the waves.
5. Leaden Fly Catcher (Myiagra rubecula, *Lath.*). Observed on one occasion only.

Timelidæ.

6. Grass Warbler (Cisticola exilis, Vig. et Hors.). This elegant little songster frequented the extensive grassy swamps. Its note somewhat differed from that uttered by mainland individuals.

Meliphagidæ.

7. Brown Honey Eater (Glyciphila ocularis, *Qld.*). This bird was very numerous. It especially resorted to Banksias (B. æmula and integrifolia) that

were in full bloom at the time of our visit. It was also seen acquiring its honey-diet from the Grass-tree (Xanthorrhæa). Its lively song drowned that of almost every other bird, and was heard almost throughout the day. The upper surface presented more of the olivacious tint than usual, the wing coverts being noticeable in this respect.

8. Yellow-faced Honey Eater (Ptilotis chrysops, *Lath*). This bird was not plentiful. Individuals were seen towards evening leaving the swamps and their flowering shrubs to roost in neighbouring eucalypt trees.
9. White-checked Honey Eater (Meliornis sericea, *Lath.*). A pair of these beautiful birds, conspicuous on account of the large white patches on the sides of the head, black and white chest feathers, and yellow wing coverts, occurred in the neighbourhood of a Banksia in bloom. They were on a small tea-tree, and were evidently resting after their full-meal that this yielded.
10. Common Leather Head (Philemon corniculatus, *Lath.*). Occurred commonly, frequenting the flowering trees.

Hirundinidæ.

11. Swallow (Hirundo neoxena).

Motacillidæ.

12. Australian Pipit (Anthus australis, *Vig. et Horsf.*). On the grassy flats amid the township of Bulwer. Singing sweetly in the early morning.

Alcedinidæ.

13. *Macleay Kingfisher* (Halcyon Macleayi, *J. and S.*). A few examples of this beautiful ultramarine blue and white kingfisher were met with.
14. *Laughing Jackass* (Dacelo gigas, *Bodd*). Occurred, but not numerous.

Cuculidæ.

15. Coucal or Swamp Pheasant (Centropus phasianus, *Lath.*). This bird occurred in or near the swampy country. An interesting instance of protective resemblance was afforded by one example. Near a Honeysuckle (Banksia), of somewhat umbrageous habit, grew a dead eucalypt. What appeared to be a small portion of a stout branch of the latter rested—as if detained in process of falling—in the leafy growth of one of its ascending limbs. Looked closely at, against the light, the somewhat grayer margin of a tail feather was observed, when the dead branch was found to be a living

centropus. In repose it had projected its head forward, and extended its body and tail in a line with this, and so perched with its short legs, it lay as it were along the honey-suckle bough.

Loriidæ.

16. Blue Mountain Parrot (Trichoglossus novæ hollandiæ, *Gmn.*). Was seen and heard, but did not occur so plentifully as the wealth of honey-producing plants would lead one to expect.

Columbæ.

17. Barred Shoulder Red Dove (Geopelia humeralis, *Temm.*) Only two examples were seen.

Phasianidæ (Quails).

18. Brown Quail (Synœcus australis, *Temm.*) Met with in grassy foreshores.

Limicolæ.

19. Shore Plover (Burhinus grallarius, *Lath.*). Heard. and its charactersitic three-toed footmarks seen on sand of sea shore.

Charadriidæ.

20. Dottrel.
21. Spur-Winged Plover (Lobivanellus lobatus, *Lath.*).

Lariidæ.

22. Sterna Bergii, *Licht.* Seen in flocks along the beach; also on sand banks at mouth of the river. Several that were shot contained in their maws an interesting fish identified by Ogilby as the Australian Pilchard.
23. Silver Gull (Larus novæ hollandiæ). The common sea-gull of Moreton Bay and the Brisbane River.

Ardeidæ.

24. White-Necked Heron, Notophoyx pacifica. White Hern (Herodias timorensis) both sparingly.

Phalacro-coracidæ.

25. Little Black Cormorant. On beacons, mouth of river.
26. Large Black-White Cormorant. Swimming in sea, near Pile Light House.
27. Little Black-White Cormorant. Swamp, along beach north of Bulwer.

Anatidæ.

28. Black Duck. Anas superciliosus.

Pelicanidæ.

29. Pelican (P. conspicillatus). On entering M. Bay.

—W.W. and H.T.

(*d*) CONCHOLOGY.

No attempt was made to systematically collect the shells to be found on the western shores of Moreton Island—the scene of the Club's investigations—but the following species — exhibited — secured amidst the flotsam and jetsam commonly occurred :—

Pholadidæ—Pholas australasiæ ; *Mactridæ*—Mactra Reevesii ; *Paphidæ*—Mesodesma, sp. ; *Tellinidæ*—Donax deltoides, *Lam.* ; *Petricolidæ*—Rupellaria, sp. ; *Veneridæ*—Tapes turgidus, *Desh.* ; *Cardidæ*—Cardium, sp. ; (Cardium (multispinosum, *Sow.* aff.) ; Lunulicardia retusa ; *Lucinidæ*—Lucina divaricata ; *Arcidæ*—arca decussata ; Anomalocardia trapezia, *Desh.* ; *Mytilidæ*—Mytilus hirsutus, *Lam.* ; *Pectinidæ*—Vola dentata, *Sow.* ; *Gasteropoda* ; *Purpurinæ*—Purpura succincta, *Martyn* ; Purpura amygdala, *Keiner* ; *Intimidæ*—*Triton* ; *Nassidæ*—Nassa mangeloides, *Reeve* ; *Volutidæ*—Voluta, sp. ; Voluta lineata ; *Cancellaridæ*—Phos senticosus (fragment) ; *Strombidæ*—Strombus campbelli, *Gray* ; *Cypræidæ*—Cypræa vitellus, *Cunn.* ; caput serpentis, *Linn.* ; arabica ; caurica, *Lin.* ; carneola, *Lin.* ; others undeterminable ; *Cassididæ*—Cassis areola, *Linn.* ; coronata, *Low.* ; sabum, *Adanson* ; pomum (fragment only) ; *Doliidæ*—Dolium olearium, *Young* ; *Naticidæ*—Natica ampla, *Phil.* ; *Ianthinidæ*—Ianthina fragilis, *Lam.* ; Ianthina globosa, *Swainson* ; *Trochidæ*—Trochus niloticus ; Calliostom, sp. ; *Fissurellidæ*—sub-emarginula nodosa, Q.G. ; *Cephalopoda*—Spirula Peronii, *Lam.*

(*e*) BOTANY.

Leaders : J. Wedd and C. White.

The observations made relate to the plants to be met with in the vicinity of the Bulwer Pilot Station (Moreton Island), and that are more or less charactersitic of the ericetal vegetation of the coastal districts in the latitude of Brisbane, the country traversed being of a dry sandy nature (sea-board, flats, and hills of low elevation) although comprising also extensive swamps tending to become dry in summer.

Trailing over the sand-hills facing Moreton Bay grow that peculiar grass Spinifex hirsutus, remarkable for having the female spikelets in dense globular heads, and the male ones in spikes forming usually clusters of two or three ; the shore Convolvulus—Ipomœa pes-capræ, the yellow-flowered Canavalia obtusifolia, and Mesembryanthemum æquilaterale. Here and there amongst them were small colonies of Stackhousia monogyna, and the blue-flowered lobelia. On their summits commonly grew Acacia longifolia, *var.* Sophoræ, and a pungent-leaved epacrid with small drupaceous fruit. Whilst behind them and between

them were stunted Banksias; the wierd-looking Casuarina equestifolia; the beautiful but evil-smelling Hibbertia volubilis; the bramble Rubus parviflora; and conspicuous here and there were the yellow-flowered composites Podolepis longipedata; Picris hieracioides, *var.* squarrosa, and sparingly in more sheltered spots the handsome sow-thistle—Sonchus maritimus.

Leaving the sand-hills and in approaching the Club's camp near the school-house, a flat thickly overgrown with Bracken Pteris aquila was traversed. In addition to this fern others met with were as follows:—Schizæa dichotoma; S. bifida—of which the latter was of rare occurrence, individual specimens having the weak fertile frouds simple and contorted; the parasol ferns, Gleichenia circinata growing in dense masses in the swamps, and G. flabellata occurring in drier situations; also Blechnum cartilagineum—the fern with esculent roots affecting too the damper situations. On the flat all round the camp were beautiful examples of the Cypress Pine—Callitris cupressiformis, and Banksia æmula—the latter with unusually large spikes. In fact, except where wet conditions forbade the growth of trees, arboreal vegetation everywhere prevailed. This, however, did not claim much attention, but it was found to comprise besides Casuarinas and Banksias, eucalypts of at least two species—E. hæmastoma and E. corymbosa; whilst a third kind—E. robusta, grew in clumps at the edge of a swamp within almost reach of the sea-spray. This eucalypt does not, as do the others mentioned, occur about Brisbane, but is a truly coastal species—at once known from these by its large turgid leaves. A second Banksia, B. integrifolia paludosa, formed bushes here and there in the swamps—its large coarsely serrated leaves being noticeable. Acacia cunninghamii was common everywhere, and the low trees of this species near the coast were one mass of blossom, and the "Native Cherry," Exocarpus cupressis form, was met with of bush-like dimensions. Grass trees, Xanthorrhæa arborea and the smaller X. hastilis, were also common; and screw pines, Pandanus pedunculata, occurred in groups in the more open spots.

The islands of Moreton Bay are rich in terrestial orchids, but these are principally in evidence some six weeks earlier (*i.e.*, mid-August) than the date of the Club's visit. However, almost adjacent to the camp occurred in profusion Prasophyllum patens, and a little further afield and still in dry situations, Caladinia carnea, with its pink star-like flowers and hairy foliage, was met with. Growing isolately occurred Thelymitra ixioides with large violet flowers; Calochilus campestris having peculiar purple fringes connected with the labellum; Caleana major, with strangely irritable flower, as we meet with in Drakæa;

and Microtis porrifolia, a lover of open moist situations. There was also found that peculiar leafless climbing orchid, Galeola cassythoides. Avoiding the swamps a noticeable feature were the bush Ricinocarpus pinifolius with its milk-white flowers, and at its feet often a second euphorbiad —the lowly herb Poranthera microphylla; and Pomax umbellata, in flower and not as usual displaying the cupules, formed by its fruit valves; the narrow-leaved protead Persoonia linearis; the bright-blue berried Eleocarpus cyaneus; Myrtus tenuifolia exhibiting clump-like growths, but neither flower nor fruit; the so-called native hop-Dodonœa triquetra; less commonly in equally dry situations were found Siebera ericoides, an elegant little umbellifer with small bunches of white flowers; the blue-flowered lilies Dianella cœrulea, with its keeled leaves, and D. lœvis; Patersonia sericea, with its simple grass-like leaves and large most delicate mauve flowers; and the uncanny Hæmadorum tenuifolium with its erect scape and loose panicle of almost black flowers; the pinnate leaved Gompholobium pinnatum; the white-flowered Pimelea linifolia; Astrotriche longifolia, a beautiful shrub with elongate-lanceolate dark-coloured leaves, white beneath with stellate tormentum; and a new variety of this with quite glabrous leaves, since named by the Col. Botanist, F. M. Bailey, glabrescens.

Emerging from the forest and repairing towards the edge of the swamps, flowering bushes grew in great profusion, often forming a thicket-like growth. These comprised the myrtaceous plants:—Homoranthus virgatus, with its small inconspicuous flowers, Leptospermum flavescens the common Tea Tree, and L. flavescens, *var.* citriodora; the Lemon Scented Tea-Tree; the legumes:—Acacia suaveolens, the pretty Dillwynias—D. floribunda and D. ericifolia, the former with closely obliquely placed leaves, and the latter with widely-separate patent ones; unusually tall examples of Pimelea linifolia, and of Hibbertia linearis, *var.* obtusifolia; the beautiful epacrid Lysenema pungens, with its large white flowers passing into pink as they faded; and Brachyloma daphnoides, a second plant of the same family—a plant with solitary diminutive blossoms; and a third epacrid Sprengelia ponceletia; the peculiar Olax retusa with cup-shaped calyx simulating an exocarp; and the pink flowered Boronia ledifolia rosmarifolia (Rutaceæ), with rose, sometimes white, flowers.

Nearer the swamp edges still were met with a second species of the last mentioned genus, viz., Boronia falcifolia, and a special variety of this with pinnate foliage also occurring on Peel Island (W. Soutter); the yellow-flowered legume Phyllota phylicoides; and the elegant protead

Conospermum taxifolium with its masses of white flowers, and the pinkish flowered Comespermum retusum (Polygaleæ).

In the swamps themselves, amidst masses of Restiaceæ (*e.g.*, Restio tetraphyllus, etc.), Cyperaceæ (*e.g.*, Scirpus nodosus, Lepronia mucronata, Schænus brevifolius, S. melanostachys and S. Brownii, and Gahnia psittacorum) grew the white heath, Epacris obtusifolia ; the crimson Bottle-Brush, Callistemon speciosus ; the lilaceous Sowerbæa juncea, with spherical heads of pale-mauve blooms ; the yellow-flowered Andrastæa salicifolia ; with here and there a clump of the Swamp Banksia—B. paludosa, or an open thicket of the proteaceous shrubs, Hakea saligna or Hakea gibbosa—both bearing their curious wooden fruits only at the time of our visit ; the pink-flowered Stylidium debile also was prevalent here. On the damp black soil at the foot of these plants grew several interesting herbs—notably the little white-flowered Mitrasacme indica, and the equally diminutive Utricularia (? U. laterifolia) ; whilst every here and there were glistening red patches of Drosera Burmanni, though a second species of erect habit Drosera binata was almost equally prevalent. There also occurred in these situations Haloragis micrantha, with tiny blossoms (suggesting a pink mist). As previously stated, the fern Blechnum spicatum was a denizen of those swamps that were also inhabited by the elegant Lycopodium laterale.

On the hill sides on which Blood wood (Eucalyptus corymbosa) and Oak (Casuarina) prevailed as timber trees, grew Jacksonia scoparia the Dog-Wood ; Pultenæa myrtoides, Bossiæa heterophylla—a curious legume with distant oblong leaves and dark-brown broad pods, Gompholobium virgatum and the Mimosa-like Acacia juniperina and Xanthosia pilosa, and Hibbertia acicularis. Also near its highest points, the proteaceous plants Strangea linearis and Petrophila Shirleyanæ—honoured by the name of the lady of our worthy President—and along the sandy country at their bases was found, besides plants already mentioned, Xerotes longifolia and Xerotes multiflora, the latter having the female blossoms condensed in spherical woolly heads. Also the curious intricately twisted cyperad Caustis flexuosa, and the composite Helichrysum oxylepis, and the liliaceous Laxmannia gracilis.

The leafless parasite Cassytha racemosa also spread its tangles over the shrubby growth, both on hill side and level country.

Other plants secured, but unspecified in the foregoing remarks, were :—Hibbertia fasciculata ; H. (? diffusa) ; Erechtites quadridentata, Goodenia stelligera, Tricoryne elatior, Endiandra sieberi (a Laurinaceous plant with black fruit), Loranthus spp. Crinum pedunculatum, Smilax glyciphylla (common at the back of the sea-beach), and Xyris complanata and Cladium glomeratum.—C.W.

DESCRIPITON OF A NEW *PSEUDOGERYGONE* FROM SOUTH-EAST QUEENSLAND.

By W. E. Weatherill, of the Q'land Museum.

Pseudogerygone cantator, sp. nov.

Adult. General colour above, olive brown, tinged with fawn on the rump; lesser and median wing-coverts like the back, greater coverts dark brown, narrowly margined with olive brown. Primaries and secondaries edged with pale brown, which becomes indistinct towards the outermost feather. Tail crossed by a broad band of black, basal half brown, each feather, with the exception of the two central ones which are brown, has a large white spot near the extremity of the innerweb, the two outermost feathers have two white spots, which are separated by a strip of brown running along the edge of the quill. Eye-ring, feathers under the eye, lores, and a line above the eye, gray. In front of the eye is an indistinct blackish spot. Under surface ashy white, lighter on the throat and under tail coverts. Thighs gray, flanks ashy gray, underwing-coverts and auxillaries white, quills white below, becoming darker near the tips. Under surface of the primaries and secondaries whitish along the edge of the inner web. Bill and feet black, iris red.

Young have the eye-ring, a line above the eye, lores, feathers below the eye, and the edges of the primaries and secondaries sulphur yellow.

Measurements of an adult male in flesh.

Total length	.. .. ..	114 millimeters
Culmen	.. ..	10 ,,
Wing	.. ..	56 ,,
Tail	.. ..	45 ,,
Tarsus	.. ..	20 ,,

Differs from *Pseudogerygone fusca*, with which it has been generally confounded, in the following characters:—

Flanks and under tail coverts washed with buff; feet and legs weak; size small, length (in millimeters) 96.5; culmen, 8.45; wing, 48.35; tail, 43.20; tarsus, 16.50 .. *fusca.*

Flanks ashy gray; under tail coverts white; feet and legs strong; size large, length (in millimeters) 114; Culmen, 10; wing, 56; tail, 45; tarsus, 20 .. .. *cantator.*

The nest is a strongly built, compact structure, of oval shape and abruptly narrowing to a long slender appendage ; it is suspended from one or more slender twigs, round which the material forming the roof is neatly and strongly woven ; the entrance is protected from the weather by an overhanging flap, similar to the eaves of a house. It is composed externally of delicate fibrous bark, fine roots, and dry grasses, firmly bound together by spiders' webs, and almost invariably ornamented with the cocoons of those insects ; internally it is lined with feathers, thistle down, and other soft material. It is most frequently suspended from the end of a mangrove bough overhanging the water. Total length 11 inches, about 5 inches of which constitute the appendage ; diameter 3 inches at the widest part ; entrance circular, 1 inch in diameter.

Eggs : Clutch, three ; long-oval in shape ; texture of shell fine ; surface slightly glossy. Colour pale pink ; some speckled all over with reddish brown spots ; others with the spots forming a dark red zone at the larger end. Outside dimensions (in millimeters) 17.8 by 12.6 to 17 by 13.2.

Type in the Queensland Museum, collected and presented by Mr. W. E. Weatherill.

This bird is a denizen of the coast and lives among the mangrove bushes on the islands of Moreton Bay, and along the banks of the rivers and creeks in South-East Queensland. It may often be observed in the parks and gardens close to the coast, busily engaged in quest of insects. At intervals of every few minutes it bursts forth into song ; this is so sweet and well sustained, that the residents of the Brisbane District call it the " Queensland Canary." Its pre-eminence as a song bird above its congeners induces me to propose the above name for the species.

TOOWOOMBA FIELD NATURALISTS' CLUB.

A large number of members and visitors attended the monthly meeting of the Toowoomba Club, held at the Town Hall on 22nd August. Mr. J. Walker read an exceedingly interesting paper on "Queensland Gems," and he exhibited a splendid collection of Queensland precious stones.

Correspondence was read, showing that the Town Council, at the request of the Club, had consented to preserve the part of the local Quarry containing a very exceptional illustration of a double-coned extinct volcano. This Quarry was visited by the Brisbane Club in November of last year, and a good deal of attention was paid to the section of the volcano, which has been beautifully exposed by the quarrying operations. The Toowoomba Club is only in its infancy, but it has already earned the gratitude of scientists for bringing about the preservation of this unique geological feature.

THE

Queensland Naturalist.

THE ORGAN OF THE FIELD NATURALISTS' CLUB
AND ITS BRANCHES

VOL. I. DECEMBER 31, 1909. No. 4.

PROCEEDINGS.

EXCURSION, 10th OCTOBER, 1908.

Mooraree.—Sixteen members present. Leaders, Messrs H. Tryon, W. R. Colledge, and R. Illidge.

EVENING MEETING, 16th OCTOBER, 1908.

Chairman : Prof. S. B. J. Skertchly. Attendance, 18.

Election : Miss Illidge. Mrs. Macrossan, Mrs. Power, Messrs. G. I. Bourne, G. W. M. Hull, and E. Jarvis.

Lecturette—By Mr. H. Tryon, on an aquatic plant (*Azolla*) from Bulimba, illustrated by specimens and drawings, explanatory of its morphology and structure.

Exhibits.—Snake-like lizards (*Pygopus*, *Lialis*, and *Anomalopus*), by Mr. H. Tryon. Moths, by Dr. T. P. Lucas. Butterflies from Cuba, by Mr. R. Illidge. Specimens illustrating the life-history of the Victorian Vine-Moth (*Agarista glycine*), and two hymenopterous parasites and a predaceous bug which are natural checks on its increase, by Mr. E. Jarvis. A butterfly (*Mesodina halzia*) new to Queensland, from Bulwer, Moreton Island, by Mr. E. Jarvis. Plants from Western Queensland, by Mr. T. Burston.

The meeting concluded with some remarks on sense-organs in plants, by Prof. Skertchly.

EXCURSION, 14th NOVEMBER, 1908.

One-Tree Hill.—Fifteen members present. Leader Mr. J. Shirley.

EVENING MEETING, 20th NOVEMBER, 1908.

Chairman : Mr. W. R. Colledge. Attendance, 31.

Election : Mr. E. Colclough.

Paper : "On Some Queensland Grasses," illustrated by lantern slides, by Dr. A. Sutton.

Exhibits.—Fleas, and photo-micrographs of same, derived from Victorian mammals, amongst them one of the genus *Stephanocircus*, from the host *Phascogale swainsoni*, that was new to science; by Mr. E. Jarvis. A flower of *Bauhinia variegata*, as an example of the relationship between colouration and function, by Prof. Skertchly. Plants from One-Tree Hill, by Mr. C. White.

EXCURSION, 5th DECEMBER, 1908.

Witton.—Nine members present. Leader, Mr. W. R. Colledge.

EVENING MEETING, 11th DECEMBER, 1908.

Chairman: Mr. W. R. Colledge. Attendance, 12.

Election: Miss A. Lloyd, Messrs. J. Burfield, E. Jones and E. H. Shearwin.

Paper: "Insect Protective Colouring and Mimicry, with a few Australian Examples," by Mr. E. Jarvis.*

Lecturette: "On *Nostoc* and its rate of multiplication, etc.," by Prof. Skertchly.

Exhibits—Examples of Protective Colouring, by Mr. E. Jarvis. *Nostoc*, by Prof. Skertchly. Larval forms of Moths (*Psychidæ*) from Corinda, by Prof. Skertchly. Mantis with Gordius worm attached, by Mr. W. R. Colledge.

ANNUAL MEETING, 12th FEBRUARY, 1909.

Chairman: Mr. J. Shirley. Attendance, 49.

Annual Report.—The Hon. Secretary read the Annual Report and Financial Statement for 1908, which was adopted.

Presidential Address.—The President, Mr. John Shirley, delivered an address on the Life of Charles Darwin, and showed a number of lantern slides in illustration of it.*

Office-Bearers.—The election of Office-Bearers for 1909 resulted as follows:—*President*, Prof. S. B. J. Skertchly; *Vice-President*, Mr. W. R. Colledge: *Committee*, Miss A. Hardgrove, Miss D. Sutton, Messrs. L. C. Green, E. Hurworth, R. Illidge and J. Wedd; *Hon. Secretary and Treasurer*, Mr. C. W. Holland.

Exhibit.—Basalt from the vicinity of Mt. Erebus, Antarctica, by Mr. L. C. Green.

EXCURSION, 13th MARCH, 1909.

Corinda.—Forty members present. Leader, Prof. Skertchly.

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* Vide Transactions.

EXCURSION, 17th MARCH, 1909.

Ipswich.—Owing to this Excursion following so soon after the one to Corinda, only seven members turned out. Mr. R. Wearne, of the Technical College, Ipswich, kindly conducted them on a geological ramble.

EVENING MEETING, 18th MARCH, 1909.

Chairman : Prof. Skertchly. Attendance, 21.

Election : Messrs. J. J. Allison, J. F. Bailey, and E. H. Gurney.

Microscopical Section.—It was announced that it was proposed to form a microscopical section of the Club, and members were invited to send in their names.

Exhibits.—Geological specimens from Mt. Garnet, by Miss Phillips. Specimens illustrating the life-history of case-moth (*Oiketicus hubneri*), by Mr. E. Jarvis. Case of Skippers (*Hesperidæ*), by Mr. R. Illidge. Sea cucumbers (*Holothurideæ*), by Mr. J. Wedd.

EXCURSION, 17th APRIL, 1909.

Bennett's Scrub (Ashgrove).—Nineteen members present. Leaders, Messrs. W. R. Colledge, R. Illidge, H. Tryon and J. Wedd.

SPECIAL MEETING, 22nd APRIL, 1909.

Chairman : Mr. W. R. Colledge. Attendance, 21.

This meeting was called for considering a proposal to amend the Rules in the direction of increasing the annual subscription, in order to provide funds for the publication of *The Queensland Naturalist.*

Rules II. and XV. were amended, so that from 1st January, 1910. the Club will comprise :—

Ordinary Members at ten shillings per annum, with the right to the Club's Journal ;

Country Members (*i.e.*, residing more than 20 miles from Brisbane) at five shillings per annum, with the right to the Club's Journal ; and

Corresponding Members (Honorary).

EVENING MEETING, 22nd APRIL, 1910.

Chairman : Mr. W. R. Colledge. Attendance, 21.

Election : Miss E. Henry, Miss C. H. Rich, Messrs. L. Cantrell, H. M. Cumming, J. R. Loney and W. M. Tanner.

Report—On plants collected during the excursion to Bennett's Scrub, by Mr. J. Wedd.*

Paper.—The Queensland *Spirogyra*, by the late F. Pigram, read by Mr. H. Tryon, who showed drawings, etc.*

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* Vide Transactions.

Exhibits.—Communication from Mr. C. F. Rousselet. London. on the subject of Collecting and Preserving Delicate Organisms. by Mr. W. R. Colledge. *Spirogyra* under the microscope, by Mr. W. R. Colledge. Birds, by Mr. W. Weatherill. *Phasma* (*Extatosoma tiaratum*) from Murwillumbah. by Mr. L. C. Green.

EXCURSION, 8th MAY, 1909.

Ekibin.—Fourteen members present. Leader, Mr. L. C. Green.

EVENING MEETING, 13th MAY, 1909.

Chairman : Mr. H. Tryon. Attendance, 22.

Election : Mr. Kenna.

Notes.—" On the History and Habits of Monotremes." by Mr. Geo. F. Bennett.* " On Reason or Instinct in Birds," by Mr. G. W. M. Hull.

Exhibits.—Platypus, by Mr. W. Weatherill. Orchids (*Dendrobium gracilicaule, Liparis reflexa*. and *Oberonia iridifolia*) from Enoggera Creek, near Kelvin Grove Bridge, by Mr. G. H. Barker. Moths, by Mr. E. H. Shearwin. Plants collected at Ekibin, by Mr. C. White. Polyzoa from Manly, Sydney, and one from Bulwer, Moreton Island, by Mr. C. W. Holland.

EXCURSION, 12th JUNE, 1909.

Hamilton.—Twenty-four members present. Leader, Prof. Skertchly.

EVENING MEETING, 17th JUNE, 1909.

Chairman : Prof. Skertchly. Attendance, 24.

Toowoomba Quarry.—A vote of thanks was passed to the Town Council of Toowoomba for its public-spirited action in consenting to conserve the portion of the local Quarry illustrating interesting geological phenomena.

Address.—" On the Geology observed during the excursion to Hamilton." by Prof. Skertchly. During the discussion which followed, Mr. Tryon referred to the fact of *Glossopteris* having been found recently in the Jura-Trias beds of Petrie's Quarry, which suggested either a different age for the beds to that hitherto assigned them or an extension of the genus beyond the stratigraphical limits which had been credited to it.

Exhibits.—Fossil plants from Petrie's Quarry, by Miss G. Edwards and Miss C. Jackson. Copies of von Ettinghausen's drawings and descriptions of Brisbane Tertiary plants, by Prof. Skertchly. Plants from Roma, by Mr. C. White. A collection of beetles (*Buprestidæ*), by Mr. R. Illidge. Two specimens of the curious leaf-tailed lizard, *Phyllurus*, and a rare snake (*Liasis childreni*) by Mr. H. Tryon.*

* Vide Transactions.

REPORT OF COMMITTEE FOR 1908.

In presenting the Third Annual Report, your Committee is pleased to be able to state that the Club has had a very successful year, and has made distinct progress.

At the Annual Meeting held on 31st January, 1908, the following office-bearers were elected, viz. :—President. J. Shirley, B. Se. ; Vice-President. W. R. Colledge ; Committee, Miss A. Hardgrove, Miss D. Sutton, G. Gross, R. Illidge, J. Johnston, H. Tryon, and J. Wedd ; Hon. Secretary and Treasurer, C. W. Holland.

The Committee held twelve meetings during the year, and the attendances were :—Mr. Shirley, 5 ; Mr. Colledge, 12 ; Miss Hardgrove, 10 ; Miss Sutton, 7 ; Mr. Gross, 8 ; Mr. Illidge, 7 ; Mr. Johnston. 9 ; Mr. Tryon, 5 ; Mr. Wedd, 7.

Our membership has increased from 121 to 130, despite some resignations and removals.

By the sad death of Mr. Thomas Kidd, late of the State School, Stafford, the Club lost a member who took a keen interest in its welfare, and who was highly esteemed by his fellow-workers for his personal qualities.

Eleven Evening Meetings were held, and these maintained their reputation for excellence. The average attendance was 22.

The object aimed at was the exhibition of specimens and discussion thereon, rather than the reading of papers. Nevertheless, some good papers and notes were read during the year, and most of them were accompanied by the specimens to which reference was made. The following is a list of the contributors and subjects :—*Mr. J. Shirley* : Tambourine Mountain ; Marine Shells. Mr *H. Tryon* : Notes on Night-Singing Birds ; The Spine-Tailed Swift and its Food ; Birds observed at Sankey's Scrub ; On Ferns from Cairns ; Birds and Shells from Bulwer. *Mr. R. Illidge* : Notes on Insects of the Wellington Point District ; Insects from Sankey's Scrub ; Insects collected in one day at Bulimba ; Insects from Bulwer. *Prof. S. B. J. Skertchly* : Geology of Sherwood. *Dr. A. Sutton* : On some Queensland Grasses. *Mr. J. Wedd* : Notes on the Flora of Wellington Point. *Mr. Cyril White* : Plants from Sankey's Scrub. *Mr. J. D. Ogilby* : On Fish from Bulwer, recording the finding of a Pilchard for the first time in Queensland Waters. *Mr. W. Weatherill* : On the occurrence of an undescribed

Bird in the Brisbane District. *Mr. E. Jarvis*: Notes on Insect Protective Colouring and Mimicry, with a few Australian examples. *Mr. W. R. Colledge*: Notes on Rotifera.

The field excursions numbered twelve, including three extended ones, and the attendance of members was, on the whole, satisfactory. One (Ipswich) had to be abandoned owing to unfavourable weather conditions.

The places visited were:—Upper Kedron Brook, Enoggera Creek, Tambourine (four days), Wellington Point (whole day), Oxley, Caloundra (a week), Sandgate, Sankey's Scrub, Bulwer (3 days), Moorarce, One-Tree Hill, and Witton.

The issue of a quarterly journal devoted to the interests of the Club, which was alluded to in last year's report, was commenced, under the title of *The Queensland Naturalist*, and an exchange of publications was arranged with the Field Clubs in the Southern States. The number of subscribers to the Journal was not as large as was expected, and it is hoped that in the coming year it may be placed on a more satisfactory basis.

A Field Naturalists' Club was inaugurated at Toowoomba during the year, and it affiliated with our Club. Already the Toowoomba Club has done good work in securing the preservation of some extinct volcanic craters in the local quarry that are of especial interest.

The Club co-operated with the various scientific societies in supporting the movement for the establishment of a Queensland University.

The Council of the Australasian Association for the Advancement of Science invited the Club to nominate a Vice-President for the Biology Section at the Brisbane Congress, and the Hon. Secretary was nominated for the position. In this connection it may be noted that eight members of the Club held office on the Council of the Association.

An account was opened in the Government Savings Bank in the name of the Club.

Attached is a financial statement, showing that on 31st December, 1908, the Club had a credit balance of £10 19s. 11d.

JOHN SHIRLEY, *President.*

C. W. HOLLAND, *Hon. Sec.*

Statement of Receipts and Expenditure for Twelve Months Ending 31st December, 1908.

RECEIPTS.						EXPENDITURE.			
			£	s.	d.		£	s.	d.
To Balance from 1907			8	17	5	By Postage	2	15	1
,, Subscriptions—						,, Telegrams	0	5	11
50 at 5s.	12	10 0				,, Rent Technical College	2	15	0
2 at 15s.	1	10 0				,, Printing	8	4	6
5 at 10s.	2	10 0				,, Stationery	0	3	6
			16	10	0	,, Photographs for Book	0	3	6
						,, Government Savings Bank	10	0	0
						,, Cash in hand	0	19	11
			£25	7	5		£25	7	5

C. W. HOLLAND,
Hon Secretary and Treas.

Examined and found correct,
A. E. JONES, A.I.A.Q.,
Hon. Auditor.

TRANSACTIONS

PRESIDENTIAL ADDRESS.

BY J. SHIRLEY, B.Sc., SENIOR INSPECTOR OF SCHOOLS, HON. MEM. ROY. SOC. TAS., PHAR. SOC. QD.

CHARLES ROBERT DARWIN.

Charles Darwin was born at Shrewsbury, on February 12th, 1809. His father was Dr. R. W. Darwin, F.R.S., a physician of eminence, with a wonderful power of diagnosing diseases, and a man of most benevolent nature. His mother was a daughter of Josiah Wedgwood, of the Etruria Potteries, Staffordshire. His paternal grandfather, Erasmus Darwin, was a robust, athletic man, a teetotaler before teetotalism, and an abolitionist before the anti-slavery laws, a writer of rhapsodical poetry and philosophical biologist. His contemporaries delighted in his poetry, but rejected his biology, a decision which is now completely reversed. Charles Darwin's grandfather is now regarded as a prime founder and early prophet of the evolutionary stysem, as may be seen from the following selection from his "Temple of Nature":—

> Organic life beneath the shoreless waves
> Was born, and nursed in ocean's pearly caves:
> First forms minute, unseen by spheric glass,
> Move on the mud, or pierce the watery mass:
> These, as successive generations bloom,
> New powers acquire, and larger limbs assume;
> Whence countless groups of vegetation spring,
> And breathing realms of fin and feet and wing.

Darwin's maternal grandfather, Josiah Wedgwood, was a skilful and indefatigable man, of indomitable energy, and with great powers of attention to detail, and of forcing his way in life against all obstacles. In Charles Darwin, the philosophic spirit of his father's family, combined with the patience, carefulness and minuteness of detail of the Wedgwood's to produce the complete man of genius.

The Darwins indeed were a very gifted family, of varied powers and striking attainments. Erasmus Darwin's brother Robert was a botanist of repute. Among his uncles, Charles Darwin would enjoy the society of Sir Francis Darwin, noted as a keen observer of animals. Several cousins were men of eminence, including Mr. Hensleigh Wedgwood, the philologist, and Mr. Francis Galton, the author of that essentially Darwinian work, "Hereditary Genius."

Little is known concerning the early life of Charles Darwin.

He went to Shrewsbury Grammar School, then taught by Dr. Samuel Butler, afterwards Bishop of Lichfield. There he picked up so much Latin and Greek as was then considered absolutely essential to the due production of an English gentleman. Happily, having little taste for classics, he escaped the ordeal with little injury to his individuality. Already he had made himself notable by his love of collecting shells, eggs, minerals, etc. At the age of 16 he was sent to Edinburgh, then the best medical school in Britain, with a view to taking up his father's profession. At Edinburgh he gave the earliest distinct evidences of scientific tastes, by contributing to a local scientific society a paper on the floating eggs of the common sea-mat, in which he had even then succeeded in discovering for the first time organs of locomotion.

The prospect of being a medical practitioner proving distasteful to him, after two sessions at Edinburgh, he removed to Christ's College, Cambridge, intending to enter the Church. He took his B.A. in 1831, and his M.A. in 1837. His degree was an ordinary one. At Cambridge, Darwin had the companionship of such men of science as Sedgwick, Airy, Ramsay, and others, whose intercourse must have done much to mould and form the coming philosopher. While at Cambridge he attracted the notice of Professor Henslow, who had previously left the chair of Geology for that of Botany. For this teacher, Charles Darwin felt the greatest love and respect. During his voyage in the Beagle, his letters overflow with feelings of veneration, affection and gratitude for his accomplished master and dearest friend. He used to say that before he met Professor Henslow, the only objects of natural history for which he cared were foxes and partridges. This love of nature was mainly fostered by the field excursions which supplemented the lectures given by Henslow to his class. During one of these excursions, Professor Henslow told Darwin that he was commissioned to offer a competent young naturalist the opportunity of accompanying Captain Fitzroy as a guest on the surveying voyage of the Beagle, and strongly urged him to accept the position. His father, Dr. Darwin, feared that the voyage might "unsettle" him for the church, but finally gave his consent, and in December, 1831, the expedition left England. This voyage lasted nearly five years, from December 27th 1831, to October 2nd, 1836; and proved the turning point in the great naturalist's quiet career. It left an abiding mark on all his subsequent life and thinking. Lamark and Erasmus Darwin were cabinet biologists, who had never beheld the great world and all that therein is; Charles

Darwin travelled over land and sea for five years, seeing a large part of the entire globe, and of the creatures that inhabit it. The starved fauna and flora of the British Islands, the mere leavings of the vast ice sheets that spread across our zone in the glacial epoch, show us a world depopulated of all its largest, strangest and fiercest creatures; a world dwarfed in all its component elements. But the tropics still preserve, in all their jungles, something of the aspect that our planet must have presented in all latitudes before the advent of man.

The Beagle sailed from England to the Cape Verde Islands, then touched at St. Paul's Rocks, Bahia, Rio Janiero, and Monte Video. At each of these places ample time was given for landing parties, excursions and collections. For two years following her arrival at Monte Video, the Beagle was employed in surveying the eastern coast of South America, and Darwin enjoyed unusual opportunities for studying the geology, zoology and botany of the surrounding districts during all that period.

In the autumn of 1833, Darwin made a journey to Buenos Ayres, and up the Parana to Santa Fe; in 1834, he visited Patagonia and the Falkland Islands. Some natives of Terra del Fuego, taken to England by Captain Fitzroy on a former voyage, had accompanied the Beagle through all her wanderings, and were, doubtless, of great help to Darwin as guides and assistants. 1835 was chiefly spent on the coasts of Chili and Peru, and in the autumn of that year the vessel crossed from South America to the Galapagos Islands. These islands will ever remain classic ground to the biologist, from their close connection with the master problems of the "Origin of Species." In these islands the great riddle of organic existence presented itself strongly, but the solution had yet to be found. Of the Galapagos islands, Darwin writes:—"Most of the organic productions are aboriginal creations, found nowhere else; there is even a difference between the inhabitants of the different islands; yet all show a marked relationship with those of America, though separated from that continent by an open space of ocean between 500 and 600 miles in width." In conclusion, he adds:—"One is astonished at the amount of creative force, if such an expression may be used, displayed on these small, barren and rocky islands; and still more at its diverse, yet analagous action on points so near each other." From the Galapagos, the Beagle steered to Tahiti, New Zealand, Australia, Tasmania, and then to the Keeling or Cocos Islands. A study of the Keeling Islands afforded a basis for his future famous observations on coral reefs. The return voyage was made by Mauritius, St. Helena, Ascension, Bahia, Perambuco, and the beautiful Azores to England.

Captain Fitzroy, of the Beagle, was afterwards better known as Admiral Fitzroy, the meteorologist. On this voyage, Darwin volunteered his services without salary, and partly paid his own expenses on condition that he retained possession of the animals and plants to be collected on the voyage.

When Charles Darwin returned to England he was nearly twenty-eight years of age; when he published the first edition of the "Origin of Species," he was nearly fifty. The intermediate years was devoted to the collection of material for the one aim of his life—the settlement of the question of organic evolution. Darwin, like Lyell, was luckily free from the necessity for earning his living. He settled down in a home of his own, with perfect leisure for carrying out the great work for which his descent and training had fitted him. The arrangement and classification of the zoological collections were his first duties. To assist him, he called to his aid Richard Owen, Waterhouse, Gould, Jenyns, and Bell. The results were embodied in a work entitled the "Zoology of the Voyage of the Beagle," of which Darwin was editor; and in the society of these experts his knowledge and critical powers were strengthened and extended.

The germs of those inquiring ideas about the origin of species were even then present, but he was too wise to give them as yet to the world. This is his own account of its slow evolution:—

"On my return home in 1837, it occurred to me that something might perhaps be made out of this question, by patiently accumulating and reflecting on all sorts of facts, which could possibly have any bearing on it. After five years work, I allowed myself to speculate on the subject, and drew up some short notes; these I enlarged in 1844 into a sketch of the conclusions that then seemed to me probable; from that period to the present day (1859), I have steadily pursued the same object. I hope that I may be excused for entering on these personal details, as I give them to show that I have not been hasty in coming to a decision."

In the early part of 1839, Charles Darwin married his cousin, Miss Emma Wedgwood, and after three years of married life in London, finally settled at Down House, near Orpington, in Kent. He was already a Fellow of the Royal Society, and Secretary of the Geological Society. Of this period of his life, Grant Allen says:—"His private means enabled him to live the pleasant life of an English country gentleman, and devote himself unremittingly to the pursuit of science. Ill health interfered sadly with his powers of work; but system and patience did wonders during his working days, which were regularly parcelled

out between study and recreation, and utilized and economised in the very highest possible degree. Early to bed and early to rise, wandering unseen among the lanes and paths, or riding slowly on his favourite black cob, the great naturalist passed forty years happily and usefully at Down, where all the village knew and loved him."

While keeping in view the main object of his life, Darwin had not been idle in other departments of scientific work. He published a valuable treatise upon Coral Reefs, mainly from his own observations at the Keeling Islands, in which he proved that atolls owe their origin to the subsidence of the supporting ocean-floor, the rate of upward growth of the reefs keeping pace, on the whole, with the gradual depression. Of this treatise Professor Geikie said, forty years later :—" No more admirable example of scientific method was ever given to the world, and if he had written nothing else, this treatise alone would have placed Darwin in the very front of investigators of nature."

Darwin's theory of the origin of Coral Reefs has been attacked of late years, and a rival theory propounded by Dr. John, afterwards Sir John, Murray. In his paper to the Royal Society of Edinburgh, delivered March 14th, 1888, Murray states :—" It seems impossible, with our present knowledge, to admit that atolls or barrier-reefs have ever been developed after the manner indicated by Mr. Darwin."

The expeditions of Professor Sollas and of Professor David, to Funafuti in the Ellice Islands, have proved conclusively that Darwin's theory is the correct one. In 1851, Darwin's monograph on the Cirripedia or Barnacles gave him a great reputation among the slower and more cautious scientific workers, as a thoroughly sound and sober scientific inquirer. Two years later a treatise on fossil barnacles completed the study of the Cirripedia.

Five years after returning home in the Beagle, Darwin had set down some notes intended to serve as a foundation for his great work on the origin of species : in 1844, he enlarged these notes " into a sketch of the conclusions which then seemed to him probable." These were shown to Sir Joseph Hooker, no doubt as a precaution to ensure his own claim of priority against any future possible competitor. But it was not until fifteen years later that Darwin's theory of evolution was to be placed for judgment before the scientific world. Meanwhile, another and less cautious worker was arriving at many of Darwin's conclusions.

Alfred Russel Wallace, a young Welsh biologist, in 1848, accompanied Bates, the author of " The Naturalist on the Amazons," to South America to collect birds and butterflies, and to study tropical life in that region. The two young zoologists were profoundly interested in the

questions of origin and metamorphosis, and of geographical distribution. In correspondence, before leaving England, they avowed to each other that their main object for study was the enigma of creation or evolution. With a few pounds in pocket, on a worn-out and unseaworthy slave-trader, they discussed the queston of mimicry, and tried to give meanings to the spots and lines on the wings of moths and butterflies. In 1852, Wallace returned to Europe, and gave to the world his interesting "Travels on the Amazons and Rio Negro."

Two years later, Wallace set out on a voyage of tropical exploration among the islands of the Malay Archipelago, and for eight years he wandered about from island to island gathering the enormous store of minute facts he afterwards revealed to the world in "Tropical Nature," and "The Geographical Distribution of Animals." From Amboyna, Wallace sent to Darwin a striking memoir, asking him to forward it to Sir Charles Lyell for presentation to the Linnean Society. To Darwin's surprise he found it to contain the spirit and essence of his own theory of natural selection, not worked out in detail, as he was working it, but with no essential idea lacking. Without a single qualm of jealousy, Darwin sent the paper, through Lyell, to the Linnean Society.

By the advice of both Sir Charles Lyell and Sir Joseph Hooker, Darwin published a few extracts from his own manuscripts, side by side with those of Wallace. The two contributions were read on July 1st, 1858. This double communication marks the birth of modern biological evolutionism. Wallace and Darwin acted with the greatest courtesy and forbearance towards each other; the elder never sought to rob the younger of his claim to priority; the younger waived his claim to divide the honours of discovery in favour of the elder.

As soon as the papers at the Linnean had been read and printed, Darwin concentrated himself upon the production of the first instalment of his great work. This instalment was "The Origin of Species," published November 24th, 1859. This work caused an almost immediate revolution in biological and general opinion, and received the all but universal adhesion of the greatest and most progressive naturalists. So many workers at once entered the field, that the remaining portions were not taken in hand by Darwin, as he had originally intended, and the great chief was left to give his time to special researches, the results of each of which were communicated to the world by special volumes.

Of Darwin's great work, Herbert Spencer writes:—"Even could the supporters of the development hypothesis merely show that the production of species by the process of modification is conceivable, they would be in a better

position than their opponents. But they can do much more than this ; they can show that the process of modification has effected and is effecting great changes in all organisms, subject to modiyfing influences . . . . . They can show that any existing species—animal or vegetable—when placed under conditions different from its previous ones, immediately begins to undergo certain changes of structure fitting it for the new conditions. They can show that in successive generations these changes continue until ultimately the new conditions become the natural ones. They can show that in cultivated plants and domesticated animals, and in the several races of men, these changes have uniformly taken place. They can show that the degrees of difference, so produced, are often, as in dogs, greater than those on which distinctions of species are in other cases founded. They can show that it is a matter for dispute whether some of these modified forms are varieties or modified species. They can show too that the changes daily taking place in ourselves ; the facility that attends long practice, and the loss of aptitude that begins when practice ceases ; the development of every faculty, bodily, moral or intellectual, according to the use made of it, are all explicable on this same principle. And thus they can show that throughout all organic nature there *is* at work a modifying influence of the kind they assign as the cause of these specific differences, an influence, which, though slow in its action, does in time, if the circumstances demand it, produce marked changes ; an influence which, to all appearance, would produce in the millions of years, and under the great varieties of condition which geological records imply, any amount of change."

Of the book itself, Allen says :—" It was one of the greatest, the most learned, the most lucid, the most logical, the most crushing, the most conclusive, that the world has ever seen. Step by step, and principle by principle, it proved every point in its progress triumphantly, before it went on to demonstrate the next." In six weeks the book had become famous, and though at first a European contest waged with great bitterness as to the truth or falsity of Darwin's wonderful volume ; yet, twenty-three years later, when all that was mortal of Charles Darwin was being laid to rest in Westminster Abbey, enlightened orthodoxy accepted his theory without reserve, as " not necessarily hostile to the main fundamental truths of religion." Hooker, Huxley, Bates, Spencer, Lubbock were among the first to give in their adhesion, and to stand boldly by Darwin's side. Even his old Professor—Henslow, though now a parish priest, boldly avowed his acceptance of the theory of evolution. Lyell alone, among scientific minds of the first order, at first hung back, but some three

years after the publication of the Origin of Species, he joined the ranks of the evolutionists.

Other works followed in quick succession. The limits of my paper will merely permit of a list of these, many of them being well known to my hearers. His "Fertilisation of Orchids" was published in 1862; "Movements of Climbing Plants" in 1865; the "Variation of Animals and Plants under Domestication" in 1867; the "Descent of Man" in 1871; the "Expression of the Emotions" in 1872; "Insectivorous Plants" in 1875; "Effects of Cross and Self-Fertilisation" in 1876; "Forms of Flowers" in 1877; "The Power of Movement in Plants in" 1880; and "The Formation of Vegetable Mould through the Action of Worms" in 1881. This was his last work.

In conclusion, we will give Grant Allen's statement of Darwin's personal qualities and character:—"His love of truth, his singleness of heart, his sincerity, his earnestness, his modesty, his candour, his absolute sinking of self and selfishness—these, indeed, are all conspicuous to every reader, on the face of every word he printed. But his sympathetic kindliness, his ready generosity, the staunchness of his friendship, the width and depth and breadth of his affections, the manner in which 'he bore with those who blamed him unjustly without blaming them in return,' these things can never so well be known to any other generation of men as to the three generations who walked the world with him."

Towards younger men especially, his unremitting kindness was always most noteworthy; he spoke and wrote to them, not like one of the masters in Israel, but like a fellow-worker and seeker after truth, interested in their interests, pleased at their successes, sympathetic with their failures, gentle to their mistakes.

Thou must thyself be true,
If thou the truth would'st teach;
Thy soul must overflow,
If thou another soul would reach;
It needs the overflow of heart
To give the lips full speech.

Think truly, and thy thoughts
Shall a world's famine feed;
Speak truly, and each word of thine
Shall be a fruitful seed;
Act truly and thy life shall be
A great and noble creed.

—*Bonar.*

NOTES ON INSECT PROTECTIVE COLOURING AND MIMICRY. WITH SOME AUSTRALIAN EXAMPLES.

By Edmund Jarvis.

Most of us have recognised in the curious colour resemblances between various animals and their surroundings, the signs of a care exercised by Nature to secure the permanence of a species.

Although some may discredit the theory of Protective Colouration, there can be little doubt that insects are perfectly aware of the advantages it affords, and are capable of making good use of them. It is not so generally known, however, that the bright and often attractive colours of many of those species that have the power of stinging, secreting acrid juices, or ejecting corrosive or volatile fluids, serve as a protection by rendering them more noticeable. A good example of this class is seen in the common green and brilliantly metallic apterous female of *Diamma bicolor*, one of the *Mutillidae*, whose conspicuous colouration and obtrusive habits seem to suggest that its powerful sting is as much feared by birds and predaceous insects as by the residents of those districts where it occurs.

Several Diptera belonging to the families *Asilidae*, *Mydaidae*, and *Conopidae* mimic the shape and colours of such hymenopterous insects as possess special means of defence, or are nauseous in taste. Some of our Queensland "Robber flies" (*Asilidae*) afford exceptionally fine examples of this kind of mimicry, and might easily be mistaken for *Sphegidae* (Sand-wasps).

On one occasion, whilst collecting ichneumonidae in the Dandenong Ranges of Victoria, I remember capturing a tipulide that had mimicked an ichneumon.

The case was interesting, and in addition to the usual mimicry of bright colours and banded legs, it seemed to have adopted the habits and mode of flight characteristic of these parasites, and was caught in the sunshine while flying from leaf to leaf of a gum-tree-sucker in a manner very suggestive of the movements of an ichneumon when searching among the foliage for a larva.

One of the best examples of mimicry among our lepidopterous insects is probably that of *Hypolimnas mysippus*, the male of which mimics *Danaus chrysippus*. Wallace tells us that in a large number of species of this genus "there is the most wonderful mimicry of other groups, so that the species have been mistaken for *Danaidae* and *Acraeidae*, and that there is perhaps nothing more

striking than the accurate manner in which some African species imitate the striped and spotted *Acreae*, which inhabits the same districts.*

There seems to be some difference of opinion as to the origin of such variation of form and colour between the sexes of these butterflies. In larger animals, and birds, etc., such differences are said to be due to the law of Sexual Selection, "which depends," says Darwin, "not on a struggle for existence, but on a struggle between the males for possession of the females"; he tells us also that "in many cases victory depends, not on a general vigour, but on having special weapons confined to the male sex."†

In the case of Lepidopterous insects, however, such variations are probably more often due to other causes, and we may reasonably suppose that the greater importance of the female insect, her usually weaker flight, and larger size, demanded special protection, and that during a long struggle for existence any variations of colour proving advantageous to the species that might have happened to appear, would, by the law of Natural Selection, have been perpetuated, and gradually have become more and more pronounced. In support of this view of the matter, we often find that where direct protection of any kind is present in a species, the sexes are alike: as in the *Danaidae* and *Heliconidae*, that are disagreeable in flavour. Stinging hymenoptera, too, with the exception of some of the Humble bees, appear to have the sexes coloured similarly.

On the other hand, it seems probable that the sexual differences of some Coleopterous and Orthopterous insects are due to Sexual Selections; and Darwin tells us that the male beetles of various kinds of *Lucanidae* often bear wounds from the huge mandibles of other males.

Swinton also inclines to this view, and observes that "the battle of male for the female that burns so fiercely in higher organizations, which gave antlers to the stag, horns to the bull, spurs to the cock, and incisive weapons to the fish, smoulders yet more intensely in mandibulate insects of the Orthoptera Coleoptera, Hymenoptera, and Neuroptera, many of whom bite and devour one another."

It is my purpose, however, to notice more particularly the effects of Protective Colouring with respect to lepidopterous insects, and perhaps a few preliminary remarks on its occurence during their larval stage may be considered of interest.

Soft-bodied caterpillars, which are especially defenceless, are usually green when just hatched, like the colour of the leaves on which they live; but after a few moults

* Wallace.—Trans. Ent. Soc., Lond., 1869.

† Darwin.—Origin of Species, Chap. 4, p. 42.

are often striped with lines of various hues that break up the surface and make them less noticeable.

Large caterpillars are sometimes marked with diagonal lines like the branching veins of leaves; or are covered with formidable stinging hairs; whilst others, still larger, frequently have conspicuous ocelli or eye-shaped spots, placed generally near the head, causing them to resemble small snakes or other reptiles. Weismann has proved by experiment that little birds are actually afraid of these big larvae. Lord Avebury, too, mentions an interesting case of a large Indian caterpillar that has acquired the power of hissing.

The Leaf-butterfly (*Kallima inachis*) is considered the finest example of Insect Protective Colouration, and is too well known to need description. Wallace was the first, I believe, to draw attention to the fact that it never settles on leaves, but upon the nearly upright twigs of bushes or trees whose leaves are dead and withered.

In this position, he tells us, the wings fit closely back to back, "concealing the antennae and head which are drawn up between their bases. The little tails of the hind-wings touch the branch and form a perfect stalk to the leaf, which is supported in its place by the claws of the hinder pair of feet, which are slender and inconspicuous. The irregular outline of the wings gives exactly the perspective effect of a shrivelled leaf."

What struck him, however, as the most extraordinary part of the imitation was the manner in which leaves in every stage of decay are mimicked, the wings of some specimens appearing variously blotched and mildewed, or pierced with holes; and in many cases irregularly covered with powdery black dots gathered into patches and spots, so closely resembling the various kinds of minute fungi that grow on dead leaves, that "it is impossible," he says, "to avoid thinking at first sight that the butterflies themselves have been attacked by real fungi."

The "Yellow Wood Nymph" butterfly (*Heteronympha merope*), which has a wide range over the Australian continent, has evolved somewhat similar protective colouring on the under surface of its lower wings, so that when resting on the dead leaves strewing the ground beneath gum trees it is not at all a conspicuous object. "The female has the wings beautifully marked with orange yellow and black, and when flying is readily seen, but upon the approach of danger it circles away a little distance, and settling suddenly upon the withered leaves, shuts up its wings, exposing to view only the outer surfaces of the lower pair, whose colour affords ample protection by matching closely the tints of the surrounding leaves. When thoroughly alarmed it has a curious habit of resting sideways, as in this position the wings are inclined at an angle,

being then easily mistaken for a dead and twisted leaf."* Sometimes when chased it will seek to escape by trusting entirely to its protective colouring, and having settled among the dead leaves, will absolutely refuse to fly up again, a ruse which is generally successful unless one happens to have seen it pitch, and has kept their eye on the exact spot.

In the heavily timbered forests of the Dandenong Ranges the females of *H. merope* pass the night settled on the trunks of large eucalyptus trees within a foot or so of the ground, but prefer to get into the cavities so often formed in the roots and butts by bush fires, and one can generally depend on finding from four to eight specimens on a big tree having suitable hollows. Perhaps they rest in this manner to avoid being disturbed by *Myrmecia forficata*, and *albo-cincta*, the formidable "bull-dog" and "jumper" ants, that occur very freely in the same locality, and are sometimes moving about on warm nights: and when settled near the ground are less easily seen from above, and may avoid the notice of bats and insectivorous birds, etc. Their colouring would seem to afford little protection in such situations by day, and if alarmed it is amusing to see the hurried manner in which they invariably decamp. At such times, however, when disinclined to fly, they will ofter resettle in similar places.

"As a result of the fires that periodically sweep through the timbered country of Victoria, blackened tree-trunks and charred logs, etc., are a marked characteristic of bush scenery. Hence it is not surprising that many insects habitually use these as resting places, and for their better protection have assumed sombre shades of colour well calculated to assure their safety in such situations. Perhaps the most extraordinary example of this class is the black grasshopper (*Coryphistes cyanopterus*), found on scorched bark and charcoal covered logs, where, indeed, it would seem to constantly reside."—*Op. cit.*

This remarkable creature is able to adapt its colour to its surroundings in a wonderful manner, and varies in shade from greyish-brown to black. It places more faith in its protective colouring than its powers of leaping, and when discovered remains motionless on the log or bark, refusing to move until almost touched by the hand. In its early stages it is somewhat gregarious, and the young nymphs are generally found on the bark of fallen trees. When no danger is near they hop from the trunk and feed on the surrounding vegetation, but if approached leap back to their log for safety. At such times, should they chance to alight on a part unlike to them in colour, they will run quickly about the trunk until finding the shade

* *Vide* Jarvis, E.—"That Deceitful Insect," *Lone Hand Mag.*, June 1st, 1908.

desired, and then remain at rest upon the protective portion. I have noticed, too, that they have a singular habit of slightly trembling when frightened, and whilst trusting in their colouring, nestle as closely to the bark as possible. The adult forms are rarely, if ever, black, but streaked with various shades of yellow, brown, and grey, and are often found hopping heavily on roads and bush tracks, etc. They are said to rest for protection on bark at the bases of large standing trees, where, assuming a vertical position, they harmonise in form and colour with the projecting irregularities so characteristic of the bark surface of *Eucalyptus obliqua*, and other gums.

Another insect with a partiality for similar resting places is *Hydriomena anthracinata*, one of the Victorian "geometer" moths, found plentifully in certain localities during summer on charred trees, and in burnt-out shells of logs and stumps. "The fore-wings on the upper surface are entirely covered with various shades of black and grey, forming a complete disguise to the insect when at rest." *Op. cit.*

This species is especially interesting from the fact that, although possessing exceptionally good protective colouration, it has not yet learned to place implicit reliance on it: since, though trusting it, in so far, perhaps, as insect eating birds are concerned, it flies hastily away on the approach of larger bodies. Whilst escaping, its quick, erratic, and often prolonged flight suggests the utmost alarm, and, as it is hard to follow and extremely difficult to catch, I am inclined to believe that all such times it may feel safer on the wing than when settled, and use its protective colouring as a last resource. I have frequently collected this species, and had abundant opportunity of watching its habits, but cannot recollect a single occasion on which it has allowed me to approach nearer than two or three feet before deserting its resting place.

THE QUEENSLAND SPIROGYRA.

By the late F. Pigram (State School, Freestone, Warwick).

The genus Spirogyra is easily recognised. To the naked eye the plants usually present the appearance of bright-green, cloud-like, floating masses, suspended in stagnant water, and are generally exceedingly slimy to the touch. Looked at more closely, they are found to consist of great numbers of threads, of varying thickness and length, in different species, often matted and intertwined, but in reality quite independent of one another, for every thread is a distinct plant. When the masses have the appearance above described, the plants are in the sterile,

or vegetative condition. Later on. if the conditions are favourable for the production of fruit (technically known as spores), the mass loses its bright green colour, and changes to a dirty brown, or yellowish-brown ; it becomes disorganised to all appearance ; separate threads can no longer be drawn out, or only a few which still remain in the sterile state ; and the whole mass seems to have become a soft, pulpy substance that falls to pieces through the fingers, as though in an advanced stage of decomposition. It is, however, at this time, that the heart of the collector is filled with joy at the sight. This repulsive-looking substance is the Spirogyra in fruit, and maybe he has visited that pool a dozen times. in as many weeks, in anticipation of that sight, and on each previous occasion found the species he wished to determine obstinately flourishing literally "like the green bay tree," in which vegetative state—as remarked already—a final determination of the species can rarely be made. Thus much for the plants as they appear to the unassisted sight. The rest must be revealed only by the aid of the microscope, for which purpose a one-inch objective is highly suitable for making all general observations ; while a higher power, a one-sixth or one-eighth inch is to be preferred for taking dimensions, as giving greater accuracy, for the dimensions are one of the most important factors in the determination of species.

Viewed through a microscope then, the green sterile threads of Spirogyra become objects of exquisite beauty. They consist of cylindrical cells of various length. united end to end, sometimes with a plane partition as in Figs. 4 to 15, in other species with the membrane of each cell curiously folded back like a hat with the crown crushed down (see Fig. 1 to 3). Upon this distinction the genus is divided into two sections. The cylindrical cell-wall is as transparent as the clearest glass. and has a pleasing lustre that is probably due to the coating of mucilage, in which it is enveloped, and to which is due its slippery feeling when handled. Within the transparent cell are one or more beautiful green spiral bands, turning (generally with great regularity) from right to left, and applied close to the inner surface of the cell-wall. The edges of the spiral bands are generally delicately notched or toothed ; the density or laxity of the turns of the spirals varies much even in the same species. I have frequently observed that where the plants have an abundance of fresh water. as when caught and held in a briskly flowing stream, the spirals are dense and the cells short ; while the same species, growing in stagnant and polluted water, exhibits lax spirals and long cells, and hence it appears that these characters are of little value specifically, but are mere indication of the vigour of the plant, in the majority of cases. In making my observations, I have in nearly every species been able to get

a greater range in the numbers expressing the length as a multiple of the breadth, than is given in the recognised works of authority. In a paper read before a society some time ago,* I entered somewhat fully into the details of the cell-structure in Spirogyra, the method of cell-division, and the manner in which adjacent cells in two parallel and contiguous threads conjugate by the formation of a connecting tube through which the contents of one of the cells pass to the other where they unite. In Fig. 7, the contents of one cell may be seen in the act of passing through the canal of conjugation and mingling with those of the adjacent cell. There is also another mode of union in Spirogyra in virtue of which Kutzing established the genus Rhynchonema in which he placed the forms in which this takes place, but as it has since been proved that the two methods may both be observed in one species, and even in the self same pair of threads, Kutzing's genus Rhynchonema is now incorporated with Spirogyra. The second method of conjugation just referred to consists in the union of the contents of two adjoining cells of a single filament, which is effected by means of a tubular passage which forms at the joint on one side, giving the joint a swollen appearance on that side, and affording to the contents of one of the cells, free access to those of the other. In Fig. 1 the fertile thread with two spores is an illustration of this method of conjugation, a method technically known as the lateral method, whereas that first described is called the scalariform method, from the resemblance to a ladder which the conjugated filaments exhibit. Fig. 1 is also an example of a species which exhibits both the lateral and the scalariform modes of conjugation.

Just as in the case of annuals among the flowering plants, the last spark of the vitality of the individual plant is consumed in the perfection of the seed, so in Spirogyra, after the completion of the spore, the threads decay and disappear, setting free the matured spores which are capable of retaining their vitality throughout very lengthened periods, when conditions are unfavourable to their germination, as in the case of drought. Thus the spores prevent the extinction of the species in many localities where, but for them, such result must inevitably occur.

Having thus briefly described the general characteristics of the genus, and before proceeding to an account of the Queensland species so far as yet known, I would offer a few observations on the principles and methods followed in the identification of the species, in the hope that some of our younger members, possessing a microscope and a love of plant life, may be induced to collect and examine the species of Spirogyra within their reach, in

whieh study they will receive the most valuable assistanee from F. M. Bailey's Botany Bulletins, Nos. VI. and XI. I would also add that I should be most happy to lend any aid in my power to any member of the society who found a diffieulty in the identification of his species, for though I distinctly diselaim any pretension to be regarded as an authority in Spirogyra, I have nevertheless made a speciality of the study of this genus for about four years, and have procured, at great eost and trouble, the great mass of the literature of the subjeet whieh I have found suffieient for the identification of every species whieh has eome in my way.

As already stated, it is necessary to obtain speeimens both of the sterile and conjugial filaments in order to determine the species. The sterile, or vegatation speeimens, should first be examined, and the partition walls between the eells attended to. If the cells are separated by a partition, that is, a plane transverse section of the filament, the speeies belongs to the seetion "Cells with the ends truncate," but if the dividing wall is folded baek, as already described, the species must be referred to the section "Cells with the ends replicate." The number of spirals must next be ascertained. To do this, it is not suffieient to observe a single filament and draw the eonclusion therefrom; for example, hundreds of filaments belonging to one species may eontain but one spiral, but upon further search odd threads may be found interspersed among them with two, or even three spirals, and this circumstanee is of importance in making out the diagnosis. The least and greatest number of revolutions described by the spirals, observed in eells the most unlike in length and density of spiral convolutions, which different filaments exhibit, must also be reeorded with exactness, with their general tendency, whether to laxity or density. By the aid of an eye-piece micrometer, and a seale, previously made, which indicates the aetual value of the divisions of the micrometer when projected on to the field of the microscope, the thickness of the filaments must be measured, and their maximum and minimum diameter noted down; also the range of multiples which the length of the cells gives of their breadth. The dimensions are most conveniently expressed in micromillemetres, this unit being the one-millionth part of a metre, the sign for which is the Greek letter *mu* (μ). The description of the sterile threads being now complete, specimens in fruit should next be mounted. The length of the fertile eells eompared with that of the sterile eells, and with that of the spore, as also the fact of the spore-bearing eells being swollen or otherwise, must be determined; and lastly, the deseription of the spore must embraee its shape, eolour when mature, range of diameter

and length, and the character of its membrane, whether smooth or otherwise.

From these data a formal description may be written out and compared with those in the works of reference, when in all probability the beginner will find no diagnosis corresponding with his own in nine cases out of ten. There may be three or four species whose diagnosis nearly approximate his own, but differing, one in one way and another in another, nor does an examination of the figures in the plates always prove of great assistance, for amongst his specimens he has probably seen individuals looking exactly like the figures of three or four distinct species, though these individuals were unquestionably all of one species. These difficulties can only be surmounted by perseverance. In the case supposed above, for instance, the student's written description of the species under examination should be compared, not alone with the descriptions of species nearly approaching it of any one author, but with those of all the authors available. He then quickly finds the one authority differs from another, and that "in the multitude of councillors there is wisdom." For that which seemed an obstacle sufficient to prevent the assignment of his specimens to some particular species in the diagnosis of one authority, often vanishes upon consulting another, especially in the matter of dimensions, until at last a species is found with which, upon a combined diagnosis, the specimen fully agrees, unless, indeed, it be a new species, and that can only be decided upon after a comparison with every species hitherto described. Failure and peseverance give a splendid training, and in time give a quickness and sagacity in the determination of species which will reward the labour of acquiring these mental attributes.

Having thus taken a brief review of the genus Spirogyra, and of the methods employed in the determination of the species, let us now proceed to enumerate the species which have been found in Queensland.

Spirogyra tenuissima.

Fig. 1 represents this, the smallest known species of the genus. It belongs, as do also the two succeeding species, to the section "Cells with the ends replicate." and exhibits both the scalariform and lateral methods of conjugation as shown in the figure. It appears to be met with only in isolated specimens, or a few threads interspersed amongst those of other species.

The thread showing lateral conjugation, after Petit.

Spirogyra Grevilleana.

Fig. 2 is copied from a photomicrograph of the living plant, with the exception of the thread with two spirals, which is from Petit's "Spirogyra des Environs de Paris."

This species also is here for the first time announced to be among the Queensland flora. It affords an example of the diversity of measurements given by different writers, for while Kutzing gives the diam. of the threads at 25 μ; Rabenhorst, at 26-31 μ; Petit at 28-33 μ; and Gay at 25-30 μ; the specimens examined by me ranged from 28-41 μ.

Found in fruit in June, in slow or still water.

Spirogyra calospora (Fig. 3).

This species is described by Prof. Moebius in Mr. Bailey's Botany Bulletin, No. VI. It is unknown to me except by the various descriptions of it, from which it appears to be a very variable species, with slender, lax, single spiral band and fruiting cells sometimes swollen, sometimes not. Its most characteristic distinction is the finely punctate or serobiculate membrane of the spore. My figures are after Petit and Wolle.

Spirogyra flavescens (Fig. 4).

This, and all the succeeding species, belong to the section, "Sterile threads with the ends truncate." Various writers give a range of from 11 to 20 μ in the thickness of the threads; mine varied only between 20 and 21 μ.

Spirogyra communis (Fig. 5).

This species forms another addition to the list of Queensland species. The figure is a copy of a photograph from life. It very closely approximates the last species in size, but is distinguished from it by the form of the sporiferous cells, which are either not swollen, or swollen only on the conjugating side. Cooke gives this as a variety of the next species, *S. longata*, from which, however, it seems to be distinguished specifically by the smaller variation in the dimensions, and by the shape of the spores.

The Queensland specimens agree well with the French except in length of cells, an unimportant character, and in the diameter of the spores, which is slightly greater. It is easy, however, to identify the species by means of the attenuated ends of the spores.

Spirogyra longata (Fig. 6).

Professor Moebius has provisionally placed the Queensland specimens, examined by him, in this species. He says: "In this species the cells in fructification are not swollen, and as far as this fact is concerned it would not be possible to assign to it the alga now being described." Cooke, however, says that the fruiting cells are swollen. According to my observations they are, for the most part, not swollen, but show occasional exceptions to this rule. It is a very variable species. I have found sterile threads slightly thinner and slightly thicker than any I have found

recorded, with cells up to ten times their diameter in length, while the diameter of zygospores has varied from 24-44 μ. Moebius gives 34 μ. Fig. 6 is copied from a drawing from fresh average specimens.

Spirogyra quinina (Fig. 7).

Many of the species of Spirogyra have quite a number of synonyms, but in most cases modern algologists are agreed upon the final choice of the specific name. In the present instance such is not the case, opinions being pretty evenly divided as to whether this species should be called *S. quinina* or *S. porticalis*. Though by far the commonest in this locality (Freestone, Warwick), I find no record of its having been found in the colony. It grows here in prodigious quantity, taking complete possession of the creek at times for miles, and is an abundant fruiter, and more variable than any species I have observed.

Fig. 7, representing it, is reproduced from a photo. showing the commonest forms. The spiral may be either slender, lax, and pale yellowish, or broad, dense, and deep green. The fruiting cells are sometimes swollen, sometimes cylindrical, and either longer or shorter than the spore, as shown in the figure. The spores also vary from elliptic to globular, green when young, afterwards changing to a beautiful chestnut brown.

Spirogyra punctata (Fig. 8).

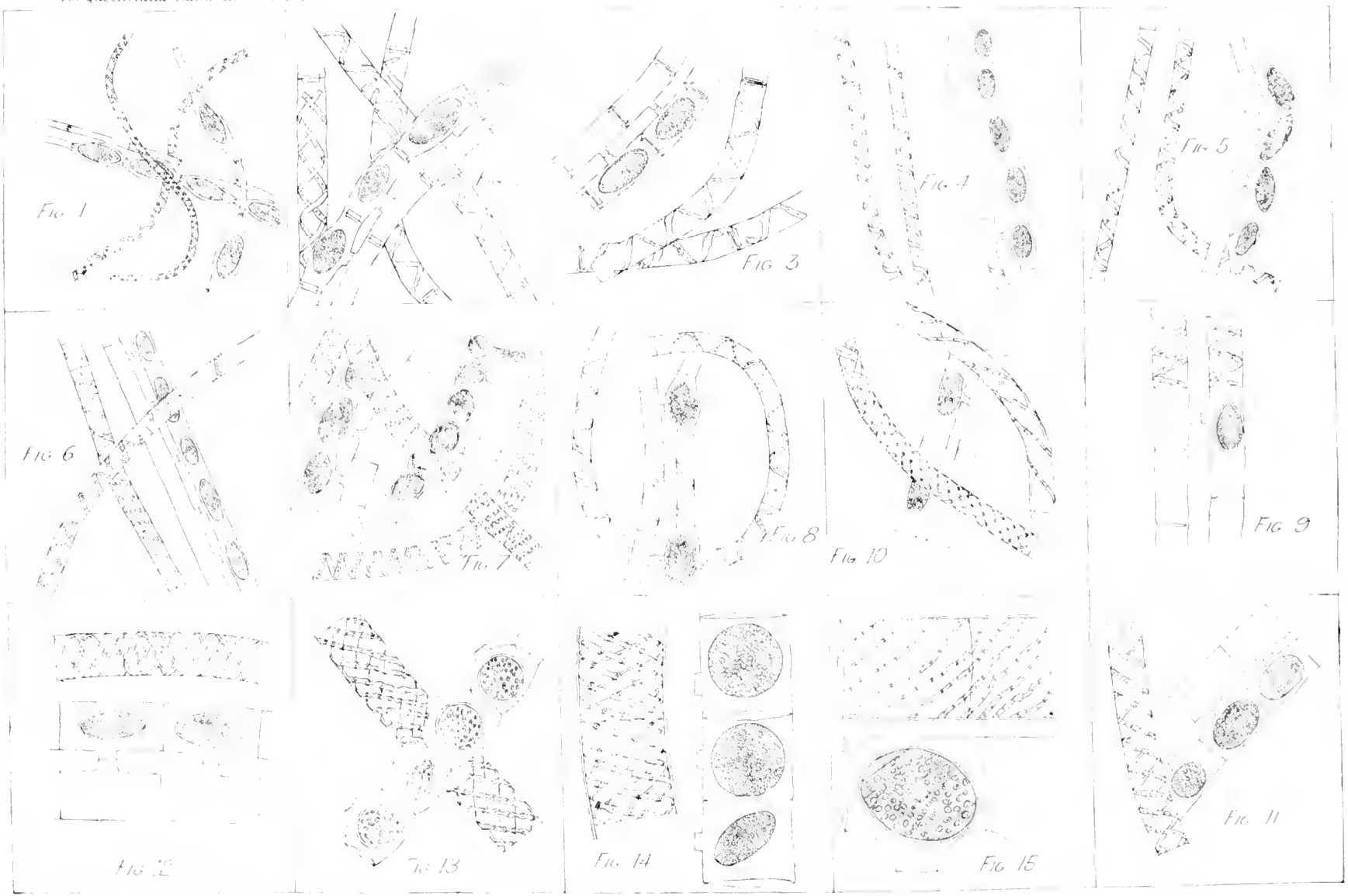
In Mr. Bailey's Botany Bulletin, No. VI., Prof. Moebius describes a Queensland variety "tenuior" of this species. Both the species and the variety are unknown to me. For the sake of completeness I have figured the species in its place after the illustrations of Petit and Wolle.

Spirogyra australensis (Fig. 9).

A description of this species may be found in Mr. Bailey's Botany Bulletin, No. XI., and the figure is copied from that of Prof. Moebius. Like the last, it has not come under my observation. They are both distinguished by spores, the membrane of which is covered by fine protuberances.

Spirogyra rivularis (Fig. 10).

In the specimens examined by Prof. Moebius, the dimensions were slightly less than those of the typical species. Specimens from this neighbourhood, however, show a maximum diameter of cells exactly corresponding with the type, a minimum somewhat smaller, and a maximum length of cells exceeding that of the type. The species is very abundant in the sterile state, but seems to be a rare fruiter. I have only once found it in fruit, though I have collected and observed it scores of times. The chief points of difference in my description compared with



QUEENSLAND SPIROGYRA

that of Moebius, from Burpengary specimens, are as follows: Diam. of sterile cells, 32-38 μ; four to fifteen times as long; spirals varying from nearly straight to four revolutions; spore diameter to 43 μ.

Spirogyra dubia (Fig. 11).

As this species has not hitherto appeared on the list of Queensland algae, I give its full description from the living plant, which agrees so closely with the diagnosis, though slightly exceeding it in some particulars, as to leave no doubt of its identity.

Spirogyra nitida (Fig. 12).

For an account of this species see Bailey's Botany Bulletin, No. XI. Fig. 12 is after the figures of Wolle and Petit, as the plant has not been seen by me.

Spirogyra bellis (Fig. 13).

Moebius having arrived at a determination of this species from an observation of the sterile threads, I have figured one in Fig. 13, as observed by me, together with Petit's figure of the fertile thread. The gelatinous sheath mentioned by Moebius did not appear in my specimens; it is probably not persistent. See Botany Bulletin, No. 11.

Spirogyra maxima (Fig. 14).

Prof. Moebius describes a variety "Minor" of this species, but the species itself does not seem to have been identified in the algae of the colony. Though varying greatly in the diameter of the cells, it is one of the easiest species to recognise. Fig. 14 is copied from a photomicrograph of the fresh specimens

Spirogyra crassa (Fig. 15).

This, the last species in the list, I have not found, and it has been admitted to a place among Queensland Spirogyra by Moebius from an examination of sterile threads only. Fig. 15 is taken from Petit's excellent work already referred to.

I desire, in conclusion, to acknowledge my indebtedness to Miss J. Affleck, of Westhall, Freestone Creek, for her kindness in colouring the figures.

EXCURSION TO BENNETT'S SCRUB, 17th APRIL, 1909.

By J. Wedd.

The ubiquitous lantana, the spell of dry weather, and the lateness of the season, rendered our visit to Bennett's Scrub less productive than it might otherwise have been. Still, many interesting plants were seen, and we were able to identify by their foliage many that, from the absence of flowers and fruit, were not considered good botanical specimens.

One of the most interesting plants seen was *Duboisia myoporoides*, a small tree common on the borders of scrubs. It had no flowers or fruit, but was easily recognised by its light yellow bark and crowded leaves. In the Queensland flora it is put in the order *Solanaceae*, but in Bentham's Flora Australiensis it appears among the *Scrophularineae*. It has valuable medicinal qualities, and needs to be handled with caution. The juice of the leaves and fruit acts rapidly on the iris, producing a widely dilated pupil in twenty minutes. The extract was introduced into practice some years ago by the late Dr. Joseph Bancroft, and the alkaloid that it contains continues to be largely used in ophthalmic surgery, both in Europe and Australia, under the name of "duboisine."

This tree has recently been supposed to have caused blindness in cattle which browsed upon its foliage.

The late Rev. Dr. Wm. Woolls states that the aboriginals make holes in the trunk of this tree, and put some water in them, which when drank on the following morning produces stupor. The same effect is brought about by rapidly chewing the leaves. He also says that branches of the tree are thrown into pools for the purpose of intoxicating the eels and bringing them to the surface.

Under the heading of "Eye Opening Tree," the "Rural Australian" a few years ago, referred to this tree as follows:—"The alkaloid known as duboisine is similar in action upon the eye to atropine, the active principle of belladonna or deadly nightshade. An illustration of this has occurred on one of the Government experimental farms. A lad was cutting a tree when a drop of sap fell into one of his eyes. The pupil dilated to an extraordinary extent, and did not subside entirely for two days."

Closely related to this tree is *Duboisia Hopwoodii*, which contains an alkaloid similar to nicotine. The leaves of this shrub are the Pituri of the aboriginals, and are chewed by them as tobacco is by some white men.

Erythrina vespertilio, or bat's wing coral tree, is not so well known as its near relative, *E. indica*, which is grown in many of the Brisbane gardens.

The fact that this tree, unlike Australian trees generally, is deciduous, shows that it is not a typical Australian tree, but that, like many of the trees in the scrubs east of the main range, it is an Asiatic production. The red flowers appearing before the leaves give it an attractive appearance. It is sometimes erroneously called the "Flame tree," which name properly belongs to *Sterculia acerifolia*.

List of Plants Collected.

Anonaceae: Eupomatia laurina. Malvaceae: Abutilon oxycarpum; Hibiscus heterophyllus. Meliaceae: Flindersia (species). Ampelideae: Vitis opaca. Sapindaceae: Dodonaea viscosa. Leguminosae: Kennedya rubicunda; Hovea acutifolia; Erythrina vespertilio. Mytaceae: Eugenia Ventenatii; Rhodamnia trinervis; Leptospermum spec: Callistemon saligna. Rosaceae: Rubus rosaefolius. Compositae: Baccharis halimifolia. Apocynaceae: Carissa ovata; Alyxia ruscifolia. Solanaceae: Solanum auriculatum; Duboisia myoporoides. Scrophularineae: Artanema fimbriatum. Bignoniaceae: Tecoma australis. Polygonaceae: Polygonum hydropiper; Muehlenbeckia graeillinia. Thymeleaceae: Pimelea altior. Euphorbiaceae: Tragia novae hollandiae: Mallotus philippinensis; Acalypha nemorum: Phyllanthus brisbanicus; Alchornea ilicifolia. Laurineae: Litsea dealbata. Gramineae: Cenchrus australis. Cycadaceae: Macrozamia spiralis. Scitameneae: Alpina caerulea. Liliaceae: Eustrephus latifolius. Filices: Pteris falcata; var. paradoxa; Doodia aspera; Adiantum hispidulum; Adiantum formosum; Aspidium decompositum.

A FEW NOTES ON THE HISTORY AND HABITS OF THE MONOTREMES.

By *George F. Bennett*, Corr. M.Z.S., London.

This interesting class has occupied the consideration of naturalists for a great number of years.

Echidna hystrix (Porcupine) was first described by G. Shaw in the Naturalists Miscellany, Vol. 3, in the year 1792, under the name of *Myrmecophaga aculeata*, and Ornithorynchus paradoxus (Platypus), in the Naturalists Miscellany, Vol. 10, 1799, under the name of *Platypus anatinus*, by Shaw.

Much speculation was made as to whether these interesting animals were viviparous or oviparous, and I think there can no longer be any doubt that they are ovi-

parous, as Mr. W. H. Caldwell's exhaustive researches in 1884 went a long way to prove that. He had everything ready to hand, as by the earlier observations of others, the breeding season was well known.

The first young Echidna sent to England were obtained by Lieutenant the Honourable Lauderdale Maule, R.N., on the banks of the Fish River, N.S. Wales, and were by him sent to Dr. Hume Weatherhead, who gave them to Professor Owen, and they formed the subject of a most interesting communication to the Zoological Society on May 27th, 1834.

My father, the late Dr. George Bennett, took up the subject after consultation with his friend, Professor Owen, and arrived in Sydney in May, 1832. He did not lose much time, as in the following September he commenced his operations in the Yass district, and was rewarded by getting a female, with two young ones, a male and a female, which he eventually got to Sydney. The old one died very shortly after its arrival, but the young ones survived for about six or seven weeks. "It was most interesting to observe these youngsters. Sometimes they would sleep in the place made for them, but suddenly, from some unaccountable caprice, they would shift their resting place, and seek repose behind a box or in some dark corner in preference to their former habitation. About dusk they would come out and eat their food, which consisted of bread soaked in water, chopped egg, and meat minced very fine."*

In 1876 I took up the subject, and carried out my observations on the Lockyer, near Helidon, on the property of the late Mr. E. Marwedel. There were a good many Platypi in a large hole on this property, where I searched for the entrance to their burrows, which was very difficult to find. However, after some time I was successful. The entrance was about three feet from the water level, and about four by three inches in size, and running upwards by a serpentine course: when I got about five feet from the entrance, I came to a chamber on the right hand side, twelve inches in length by six inches high and eight inches in diameter. I thought I had arrived at the end of the burrow, but on probing further on my left, I found that it still ran on, so I continued to dig until I had got about five feet further, when I found a chamber similar in size to the first, my burrow still continuing to the left. I then proceeded with my digging, and did not reach the end until I had got another ten feet, when to my delight I found a chamber measuring eighteen inches by ten inches and eight inches in diameter, which contained a nest formed of dried grass, reeds and gum leaves, evidently from their blackened

* Bennett Proceedings Zoological Society, 1834.

appearance taken from under the water. In the nest were two young Platypi, probably about a month old, rolled up in a ball, with the tail lying flat on the beak. I got several young ones this trip, and I was amused at the way they were lying—some as above, or rolled up with the tail covering the head, and the beak resting on the stomach, or on the back, with the right paw resting on the tail coiled up. They were all very fat and plump, but without fur, of a greyish colour, and evidently about a month old. I was not able to keep them alive, but put them in spirit and sent them to my father in Sydney.

In digging out other burrows I found it a great saving of labour, instead of digging out the burrow the whole way, to push a stick forward about five feet, and then dig down and open up, as the shortest I dug out was twenty feet long, rising upwards to within two feet of the surface at top.

We were fortunate in getting two full-grown Platypi, which my companion, Mr. Blakeston, shot. As they both turned out to be females, I decided that I would dissect them, and found that they both had young ones, and probably were the mothers of some of the young we had already obtained.

I decided that I would then dissect the mammary glands, which I got out with the mammary areola perfect. It was a most interesting specimen. The glands were very much distended, being filled with a light milky substance, and when compressed slightly, this issued through some punctures, but no sign of nipple was present. We then carefully examined the young ones, and found that the tongue was close to the end of the lower mandible, and the width of the mouth corresponded with the areola of the mother, with a fold of integument across the angle of the mouth. The young one received its nourishment by the combined action of suction on its own part, and the compression of the glands by the mother, which proved Professor Owen's theory of the coadaptation of the mouth of the young one to the mammary outlet of the parent. From these observations I am satisfied that the months of September, October and November are the best to get an impregnated Platypus. Considering the size of the egg of the Platypus, and the fact that the mother has no pouch, the question arises—How does the young one get fastened to the areola to receive nourishment? Perhaps some of our young naturalists may wish to work out this subject, for which purpose I would recommend the Echidna as the easiest subject to investigate. The breeding season of Echidna is July and August. The males have a spur on the hind leg, which is absent in the female.

Mr. Caldwell sums up his observations as follows:—

"The Ornithorynchus produces two eggs at a birth,

while the Echidna has only one. The former places her eggs in a nest at the end of the burrow: the latter carries her egg in the ventral pouch. The egg is laid at an age equal to a thirty-hour chick."

[NOTE.- The Chairman (Mr. H. Tryon) dwelt on the discoveries pertaining to the natural history of the Monotremes made subsequent to the observations related by Mr. Bennett, and especially on the interest of the group from an anatomical standpoint. - ED.]

NOTES ACCOMPANYING EXHIBITS, ETC.

By Henry Tryon.

(1) Leaf-Tail Lizard (*Gymnodactylus*).

This peculiar lizard, of which three examples are exhibited, is a member of the family of the Geckos, a very special group distinguished amongst other features by their depressed bodies, their stout build, their rough granular glossless skin, the possession of labial scales. As the outcome of their nocturnal habits, the eyes are large, and, as in snakes, are covered with a transparent skin, that united with the conjunctivum, encloses them in a kind of capsule. To enable them to cling to the perpendicular and over-hanging surfaces on which their insect diet is procured, their well-developed toes are variously provided with wing-like expansions, channels, grooved pads, or with discs capable of being opened out and closed again in a fan-like manner. Pads sometimes take the place of strong claws, the latter are often more or less retractile, occurring curved below terminal cushion-like swellings. In one division of these lizards the toes are more simple, and are unprovided with wings, discs or pads, and are hence termed Naked-toed Geckos, *Gymnodactylus*.

This genus, *Gymnodactylus*, is evidently a very ancient one, ranging throughout Australia, the Eastern Archipelago, some of the Pacific islands (*e.g.*, Solomon Islands), Asia, and the European Continent, a species occurring even in Argentina, *G. borellii*, Nikelski.

The majority of the species of *Gymnodactylus* are like ordinary Geckos, two Australian species, however, *G. millusii*, Gray, and *G. sphyrurus*, Ogilby, have peculiar tails, that of the former being short, thick, swollen, and nearly as broad as the body, and the latter, although thick, quadrilateral and broader than long.

More remarkable still are two species of *Gymnodactylus* that may be named Leaf-Tailed Lizards, as suggested by the great French naturalist, Cuvier, in the term *Phyll-urus* that he applied to one of them.

These Australian leaf-tailed lizards, although rare, were, in the case of one species—*Phyllurus platurus*— early in colonial history brought under notice.

This was both described and figured under the name of the Flat-Tailed Lizard, *Lacerta platura*, by "John White, Surgeon to the Settlement," in that rare quarto, "Journal of a Voyage to New South Wales," published in London, in 1790.

The honour of making known—after an interval of rather more than 100 years—the second species, *Phyllurus cornutus*, was reserved for our fellow-member, J. Douglas Ogilby (*Records of the Australian Museum*, Vol. II., No. 1, 8-10 April, 1892), who named his discovery *Gymnodactylus cornutus*, sp. nov. The occurrence of "a strong spinate knob surmounted by a conical tubercle, behind the eye" giving rise to the term *cornutus* (horned) applied to this Leaf-Tail.

Geekos, as is the case with some other lizards, loose their tails very readily, and are capable of reproducing these organs, although the second editions are not facsimiles of those that they replace; and, this is true of the Leaf-Tail Geekos now under consideration.

Two of the three examples now exhibited are apparently endowed with these new growths.

In them we observe that this broad-flattened organ is as smooth above as below, and simply covered with minute scales in transverse lines separated by fine striae. It has also the margin for the most part even and continuous. It again may be narrower or broader than the original organ.

The third specimen presents a strikingly dissimilar tail. This is conspicuously and irregularly festooned, the lobes—larger anteriorly—being fringed with spines. In addition, above on each side of the smooth central area, there occur besides the fine disc set scales, erect conical spines, that are continuous with the conspicuous series on the narrow tail extremity. This may be regarded as the original tail in its fully formed state.

Ogilby refers to the presence of "soft triangular appendages," occupying in part the upper surface, but leaves one to infer that the margin is entire.

A few years subsequent to Mr. Ogilby's announcement of a second Australian species of the Leaf-Tail Gecko, specimens procured by Dr. Coppinger, of H.M.S. Alert, and the officers of the Challenger Expedition of a *Phyllurus* were examined by Dr. A. Gunther and he finding amongst them specimens corresponding to our third example described and figured it under the name *Phyllurus lichenosus* (*Novitates Zoologicæ* IV., p. 404, pl. XII., 1897), but Garman, *Bulletin Mus. Compar. Zool. Harvard*, xxxix. p. 2 (1901)

has since established the identity of Ogilby's and Gunther's species.

The name *lichenosus* is a very appropriate one since it recalls the appearance of the lizard with its "Colors—chestnut, or blackish brown above, with fine large angular whitish marks, undulated or marked with brown," as being suggestive of the lichen covered bark clothing the trunks of the scrub-loving trees that it resorts to. Whereas the "horns" on the head is a character more or less obscure and inconstant.

It will be noticed that its under surface is flat. This feature would facilitate the adherence of the reptile to smooth perpendicular surfaces. A spine bearing wrinkle binding it on either side would also serve a like purpose. This is absent in White's species, *P. platurus*.

The three specimens exhibited are the outcome of the liberality of (1) Harding Bros., Johnstone River; (2) H. Noon, Johnstone River, *per* W. Lennon, M.L.A.; (3) R. Lahey, Canungera Creek, South Queensland.

The example contributed by Mr. Lahey, occurred much further to the south than any recorded locality for the species, Port Denison (Dr. Coppinger) being the extent of its known range in this direction hitherto.

(2) *Children's Liasis Snake.*

This elegant snake is named *Liasis childreni*, Gray, and is one of the denizens of Western Queensland. It was kindly donated to me by W. Hamilton, M.L.A., having been obtained by his friend, Mr. W. Higgins, at Kynoma, Diamantina River, where it has the reputation, not only of being a very rare ophidian, but one that is highly venomous. However, it is perfectly harmless, being included in the same family as the common Carpet Snake and the Black Head Snake (Aspidiotes melanocephalus) of the central coastal area.

Its pattern, oblong transverse black spots on the back, and rounded ones of the same colour in two series at the sides, will serve to distinguish it.

The author of the "Australian Snakes," G. Krefft, admits never having seen a specimen. A single example, however, is included in the collection of snakes on exhibition at the Queensland Museum.

(3) *Glossopteris in Trias—Jura Rocks.*

Shortly prior to his departure from Brisbane, Mr. Annear, a student of paleontology temporarily associated with our Club, showed me a fossil plant that he had obtained in Petrie's Quarry, that I had no hesitation in referring to the genus *Glossopteris, i.e.*, a fossil usually regarded as one indicating Permo-carboniferous age in a Trias-Jura formation.

During the present month, a report by L. S. Ball, Assistant Government Geologist of Queensland, entitled, "Notes on Coal at Mount Mulligan," a place at the back of Cairns, has appeared, and in this the geologist referred to narrates a similar occurrence elsewhere (*vide Queensland Mining Journal*, p. 280, 15 VI., 9. He states:—

"A most interesting and important result of the visit was the discovery of *Glossopteris* and *Vertebraria* in shales associated with the coal. *Glossopteris* has been reported (Geology of Queensland—Jack and Etheridge, pp. 518 and 558) in only one instance from beds believed to be newer than Permo-carboniferous in Australia."

CORRESPONDENCE.

The Editor, *The Queensland Naturalist.*

Sir,—

Mr. W. M. Hull asks what bird utters the mournful note at night, which he describes.* I certainly should judge it to be the Square-tailed or Brush Cuckoo (*Cacomantis flabelliformis*). I have frequently heard this bird uttering the note described, and at frequent intervals throughout the night, dark or otherwise.

The birds are usually single, and are migratory. The Chestnut-Breasted Cuckoo has the same habit in North Queensland, and if anything, utters it more frequently than its more Southern ally.

Yours,

D. LE SOUËF,

Melbourne Zoological Gardens.

[NOTE.—Mr. H. Tryon, to whom this letter has been referred, now states that the Brisbane bird alluded to by Mr. Hull is evidently the square-tailed Cuckoo, *C. variolosus*, Horsf.—ED.]

To the Editor, *The Queensland Naturalist.*

Sir,—

To Mr. H. Tryon's interesting paper on the Spine-Tailed Swift (*Chœtura caudacuta*), page 38, No. 2 of your Journal, I would like to add a few more details.

When these birds are migrating, they usually do so in company with the White-Rumped Swifts (*Micropus pacificus*), and they also nest in company with these birds, as on the cliff at the Kegon Waterfalls, in Japan. I saw the larger mud nests of the Spine-Tailed fastened on to the rocky side, and the White-Rumped were building in crevises and hollows alongside, but out of sight. I described it in the October (1907) number of the "Emu," page 73. They usually leave Tasmania and Victoria in February and March on their way north.

Yours,

D. LE SOUËF,

Melbourne Zoological Gardens.

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* Queensland Naturalist, No. 2, p. 40.

THE

Queensland Naturalist.

THE ORGAN OF THE FIELD NATURALISTS' CLUB AND ITS BRANCHES

VOL. I. MARCH 31, 1910. No. 5.

PROCEEDINGS.

EXCURSION, 10th JULY, 1909.

Sandgate.—Twelve members present. Leaders: W. R. Colledge and J. Wedd.

EVENING MEETING, 19th AUGUST, 1909.

Chairman: S. B. J. Skertchly. Attendance, 44.

Lecture: "Toowoomba's Gift to Science," by S. B. J. Skertchly, in which the geology of the Toowoomba Range was dealt with. The lecture was illustrated by a large number of drawings and specimens.

EXCURSION, 11th to 13th SEPTEMBER, 1909.

Glass House Mountains.—A camp was formed, and was attended by 35 members. Unfortunately, heavy rain fell during a great part of the time, but despite this drawback useful field work was done, under the leadership of B. Dunstan and S. B. J. Skertchly (Geology); H. Tryon and R. Illidge (Entomology); W. R. Colledge (Pond Life); J. Wedd and C. White (Botany); and W. Weatherill (Ornithology).

EVENING MEETING, 30th SEPTEMBER, 1909.

Chairman: S. B. J. Skertchly. Attendance, 33.

Election: F. Raymond Charlton.

Reports: Glass House Mountains Excursion—(*a*) Botany, J. Wedd and C. White, with list of plants collected (*vide* Transactions p. 119); (*b*) Entomology and Ornithology, H. Tryon; (*c*) Pond Life, W. R. Colledge.

Notes: On a visit to Gold Creek Reserve by G. H. Barker (*vide* Transactions, p. 120).

Exhibits: Plants from Glass House Mountains by J. Wedd and C. White, in whose absence they were commented upon by J. Shirley. "Blue Ants" (*Diamma bicolor* Fam. Thynnidæ), from Glass House Mountains, and Weevils (*Amycteridæ*), by R. Illidge. Drawings intended for a forthcoming work on "A White Australia," by S. B. J. Skertchly.

EXCURSION, 9th OCTOBER, 1909.

Rocklea: Fifteen members present. Leaders: W. R. Colledge, H. Tryon, S. B. J. Skertchly, and E. Jarvis.

EVENING MEETING, 14th OCTOBER, 1909.

Chairman: S. B. J. Skertchly. Attendance, 13.

Election: Mrs. A. H. Mikalson, J. W. Hirst, Mrs. Hirst, R. Hamilton, and C. F. Hinrichsen.

Reports: Rocklea Excursion—Geology, S. B. J. Skertchly; Entomology, H. Tryon and E. Jarvis (*vide* Transactions, p. 123); Pond Life, W. R. Colledge.

Lecturette: "Geology of Glass House Mountains" by S. B. J. Skertchly.

Exhibits: Insects collected at Rocklea by H. Tryon and E. Jarvis; Beetles (*Buprestidae*) by R. Illidge; Vesicular basalt containing precious opal, by S. B. J. Skertchly.

EXCURSION, 15th NOVEMBER, 1909.

North Pine: Twenty-four members present. Leaders: S. B. J. Skertchly, W. R. Colledge, H. Tryon, R. Illidge, and J. Wedd.

EVENING MEETING, 18th NOVEMBER, 1909.

Chairman: S. B. J. Skertchly. Attendance, 11.

Expression of Sympathy: The President spoke in a feeling manner of the late George Essex Evans, and an expression of sympathy with the family of the deceased poet was passed.

Reports: Insects collected at North Pine, drawing special attention to an aquatic caterpillar (*Paraponyx-Pyralidae*), by H. Tryon. Pond Life of North Pine Excursion, by W. R. Colledge.

Exhibits: Insects from North Pine by H. Tryon. Burdekin Plum by Miss Brabazon. Butterflies by E. H. Shearwin.

EXCURSION, 4th DECEMBER, 1909.

Nudgee: Eight members present. Leaders: S. B. J. Skertchly and H. Tryon.

EVENING MEETING, 9th DECEMBER, 1909.

Chairman: S. B. J. Skertchly. Attendanee, 16.

Election: R. Hülsen and A. G. Jaekson.

Lecturettes: "Halley's Comet," by Dudley Eglinton. "Life-History and Habits of the Horse Bot Fly (*Gastrophilus nasalis*)," illustrated by drawings and specimens, by H. Tryon.

Exhibits: Plants from North Pine, by C. White, among them being *Passiflora alba*, a native of South Ameriea, which is now a naturalized scrub weed. This climber has lately been proved to be of a decidedly poisonous eharaeter by Mr. S. Dodd, Prineipal Govt. Veterinary Surgeon. Mr. White also exhibited *Mutinus pentagonus*, a fungus of the tribe *Phalloidei*. The sporiferous portion emits a disagreeable odour. somewhat resembling rotten meat, whieh is an attraetion for inseets that are lovers of, or breeders in, putrid matter. The agglutinative spores—it is reputed—are eaten by the inseets, or carried away attaehed to their legs and bodies, and thus this remarkable fungus is distributed. A mud wasp's nest from Glass House Mountains, and parasites obtained therefrom, by R. Illidge. Beetles (*Cetonidae* and *Dynastidae*), by R Illidge. Skin of an indigenous rat (? *Haplotis Grayi*), from the Western Distriet, by Miss E. Barker.

ANNUAL MEETING, 27th JANUARY, 1910.

Chairman: S. B. J. Skertchly. Attendanee, 40.

Annual Report: The annual report of the Committee for 1909 was read and adopted (*vide* p. 117).

Presidential Address: The President delivered an address on "The So-called Imperfeetion of the Geologieal Reeord" (*vide* Transactions p. 125.)

Suspension of Rule: H. Tryon moved, and G. H. Barker seconded, "That Rule VII. (2), so far as it debars Members of Committee from holding offiee continuously beyond a period of two years, be suspended for 1910." Carried.

Office-Bearers: The election of Offiee-Bearers for 1910 resulted as follows:—*President*, W. R. Colledge; *Vice-President*, Jos. Wedd; *Committee*, Miss E. Brabazon, Miss A. Fortescue, G. H. Barker, E. Hurworth, H. Tryon, and C. White; *Hon. Secretary and Treasurer*, C. W. Holland.

EXCURSION, 5th FEBRUARY, 1910.

One Tree Hill: Eight members present. Leaders: H. Tryon and C. White.

EVENING MEETING, 24th FEBRUARY, 1910.

Chairman: W. R. Colledge. Attendance, 23.

Election: J. Lamb.

Reports: One Tree Hill Excursion—Entomology, by H. Tryon and E. Jarvis: Botany, by C. White.

Address: "On a recent investigation of the marshlands at the mouth of the Nerang River," by S. B. J. Skertchly, who stated that he found the low lands are part of an old land surface such as is found at intervals all along the Queensland coast, sometimes in stretches of a couple of hundred miles. As these old terrestrial deposits go down far below sea level, and as their eastern boundary is cut off by the present coast, we have in them an additional proof that in quite recent geological times Australia extended many miles outwards into what is now the ocean. This old surface was subsequently cut into by the sea in places, and a fine series of sub-fossil marine shells was exhibited. He also showed that the Nerang River once flowed through the centre of the marshland, and entered the sea near Little Burleigh Head.

Paper: "Shells procured by S. B. J. Skertchly in the marine deposits of the Lower Nerang District," by H. Tryon.

Exhibits: Maps and shells illustrating his address, by S. B. J. Skertchly. Insects from One Tree Hill, by H. Tryon. Grasshoppers from One Tree Hill, and some from Victoria, by E. Jarvis. Plants from One Tree Hill, by C. White, including *Richardsonia stellaris*. This plant, an introduction from South America, was found by the Club in great quantity between Northgate Junction and Nudgee, in November last, and again on the top of One Tree Hill, in February. Previously it had only been found in Australia at Mosman's Bay, N.S.W. Fruit of *Solanum aculeastrum*, by C. White. This plant, a native of South America, was introduced into Queensland for hedge-making, and is now spreading over many localities. Beetles (*Cetonidae*), by R. Illidge. Living Rotifers (*Trochosphæra aequatorialis*), under the microscope, by W. R. Colledge (*vide* note in *Queensland Naturalist*, Vol. I., No. 2, p. 52).

EXCURSION, 12th MARCH, 1910.

Sandgate: Eight members present. Leaders: W. R. Colledge, H. Tryon, G. H. Barker, and R. Illidge.

REPORT OF COMMITTEE FOR 1909.

Your Committee have much pleasure in presenting the fourth annual report.

At the annual meeting held on 12th February, 1909, the following office-bearers were elected, viz. :—*President*, S. B. J. Skertchly ; *Vice-President*, W. R. Colledge ; *Committee*, Miss A. Hardgrove, Miss D. Sutton, L. C. Green, E. Hurworth, R. Illidge, and J. Wedd ; *Hon. Secretary and Treasurer*, C. W. Holland.

Thirteen meetings of the Committee were held, and the attendances of members were :—Prof. Skertchly, 11 ; W. R. Colledge, 11 ; Miss A. Hardgrove, 10 ; Miss D. Sutton, 9 ; L. C. Green, 4 ; E. Hurworth, 2 ; R. Illidge, 6 ; J. Shirley (ex officio Immediate Past President), 2 ; J. Wedd, 7.

Nineteen new members were elected during the year, and the Club has now a roll of 120.

The evening meetings numbered eleven, and the average attendance was 25. The exhibits at the meetings were varied in their nature, and afforded opportunity for the discussion of many phases of natural history. Many interesting papers and notes were also read.

One special meeting was held for the purpose of considering a proposal to increase the annual subscription to 10s., with a view to providing funds for the publication of *The Queensland Naturalist*. This meeting amended the Rules so that from 1st January, 1910, the Club will consist of (*a*) Ordinary Members at 10s. per annum, with the right to the Club's Journal ; (*b*) Country Members (*i.e.*, residing more than 20 miles from Brisbane), at 5s. per annum, with the right to the Club's Journal ; and (*c*) Corresponding Members (Honorary).

Ten excursions were made, and the places visited were Corinda, Ipswich, Bennett's Scrub, Ekibin, Hamilton, Sandgate, Glass House Mountains (three days), Rocklea, North Pine (whole day), and Nudgee.

The sad note of the year was the death of Major Geo. Gross, who was one of the foundation members. Major Gross was a member of the Committee for two years, and he always took an active interest in the Club. So capable a conchologist can ill be spared.

The Committee regret that the publication of *The Queensland Naturalist* had to be suspended for the first

three quarters of the year, owing to want of funds, only one number being issued, viz., on 31st December. It is expected that its regular issue will be resumed during the current year.

As an outcome of the excursion to the Glass House Mountains, the Club approached the Minister for Lands with the object of endeavouring to secure the reservation of the area containing those interesting features as a National Park, in order to preserve the flora and fauna. The Minister was unable to grant the request, but he promised to do all he could in the way of meeting the Club's wishes.

The Club sent delegates to a conference of scientific societies convened by the Royal Society for the purpose of considering a proposal to celebrate the Jubilee of Queensland from the scientific point of view.

On the 31st December last, the Club had a credit balance of £14 11s. 9d., as shown by the appended statement.

SYDNEY B. J. SKERTCHLY,
President.

C. W. HOLLAND,
Hon. Secretary.

18th January, 1910.

Statement of Receipts and Expenditure for Twelve Months Ending 31st December, 1909.

RECEIPTS.	£	s.	d.	EXPENDITURE.	£	s.	d.
To Balance from 1908 ..	10	19	11	By Postage	2	2	8
,, Subscriptions ..	11	10	0	,, Printing	1	10	6
				,, Rent Technical College	2	15	0
				,, Bookbinding	0	12	6
				,, Rubber Stamp ..	0	5	6
				,, Advertising	0	9	0
				,, Stationery	0	3	0
				,, Balance	14	11	9
	£22	9	11		£22	9	11

C. W. HOLLAND,
Hon. Secretary and Treas.

Examined and found correct,
A. E. JONES, A.I.A.Q.,
Hon. Auditor.
20th January, 1910.

TRANSACTIONS

LIST OF PLANTS COLLECTED AT GLASSHOUSE MOUNTAINS, SEPTEMBER 11th to 13th, 1909.

By J. Wedd and C. White.

Dilleniaceae: *Hibbertia stricta.* Pittosporeae: *Bursaria spinosa.* Violarieae: *Viola betonicaefolia*: *V. hederacea.* Tremandreae: *Tetratheca thymifolia.* Polygaleae: *Comesperma ericinum.* Hypericineae: *Hypericum gramineum.* Malvaceae: *Hibiscus heterophyllus.* Sterculiaceae: *Keraudrenia Hillii.* Tiliaceae: *Elaeocarpus cyaneus.* Geraniaceae: *Oxalis corniculata.* Rutaceae: *Eriostemon myoporoides.* Meliaceae: *Synoum glandulosum.* Stackhousieae: *Stackhousia viminea.* Rhamneae: *Pomaderris phillyræoides*; *P. elliptica*; *Alphitonia excelsa*; *Cryptandra ericifolia.* Ampelideae: *Vitis hypoglauca.* Sapindaceae: *Dodonaea viscosa*; Leguminosae: *Chorizema parviflorum*; *Gompholobium virgatum*; *G. pinnatum*; *Jacksonia scoparia*; *Hardenergia monophylla*; *Hovea heterophylla*; *H. acutifolia*; *Platylobium formosum*; *Kennedya rubicunda*; *Acacia plagiophylla*; *A. viscidula*; *A. penniuervis*; *A. Cunninghamii*; *Pultenaea villosa*; *P. polifolia*; *P. retusa.* Rosaceae: *Rubus parvifolius.* Myrtaceae: *Calythrix tetragona*; *Leptospermum flavescens*; *L. Luehmanni*; *L. scoparium*; *Eucalyptus acmenioides*; *Eugenia* (2 *species*); *Tristania suaveolens*: *T. conferta.* Melastomiaceae: *Melastoma malabathricum.* Compositae: *Olearia stellulata.* Stylidieae: *Stylidium graminifolium.* Goodenovieae: *Dampiera stricta*; *Goodenia* (*spec.*): Epacrideae: *Trochocarpa laurina*. Oleaceae: *Notelæa ovata.* Asclepiadeae: *Hoya australis.* Labiatae: *Prostanthera phylicifolia*; *Ajuga australis.* Piperaceae: *Piper Novae-Hollandiae*; *Peperomia leptostachya.* Proteaceae: *Persoonia media*; *Banksia latifolia*; *B. integrifolia*; *Xylomelum pyriforme*; *Hakea saligna*; *H. gibbosa*; *Lomatia silaifolia.* Thymeleaceae: *Pimelea linifolia.* Loranthaceae: *Loranthus longiflorus*; *L. Quandang.* Euphorbiaceae: *Pseudanthus pimeleoides.* Urticaceae: *Ficus Cunninghamii.* Casuarineae: *Casuarina suberosa*; *C. torulosa.* Orchideae: *Dendrobium Kingianum* (*pink*); *D. monophyllum* (*yellow*); *D. speciosum*; *D. linguiforme*; *Galeola cassythoides*; *Diuris*

aurea; *Caladenia carnea*; *C. caerulea*; *Calanthe veratrifolia*; *Microtis porrifolia*; *Cymbidium albuciflorum*. Iridaceae: *Patersonia glabrata*. Dioscorideae: *Dioscorea transversa*. Liliaceae: *Eustrephus angustifolius*; *Cordyline terminalis*; *Dianella laevis*; *D. caerulea*. Juncaceae: *Xerotes longifolia*; *X. multiflora*, and a peculiar species as yet undetermined; *Xanthorrhaea arborea*; *X. hastilis*; *Juncus pallidus*. Aroideae: *Gymnostachys anceps*. Restiaceae: *Restio gracilis*. Cyperaceae: *Lepironia mucronata*; *Schoenus Brownii*; *Lepidosperma concavum*; *Cladium glomeratum*; *C. teretifolium*; *Gahnia psittacorum*. Gramineae: *Micraira subulifolia* (a remarkable grass, covering the rocks). Lycopodiaceae: *Psilotum triquetrum*. Filices: *Lygodium scandens*; *Schizaea bifida*; *Davallia dubia and pyxidata*; *Lindsaea Fraseri*; *Todaea barbara*; *Gleichenia flabellata*; *G. dicarpa*; *G. dichotoma*; *G. circinnata*; *Adiantum hispidulum*; *Cheilanthes tenuifolia*; *Doodia aspera*; *D. heterophylla*; *D. caudata*; *Aspidium molle*; *A. exaltatum*; *Polypodium rigidulum*; *var. Vidgeni*; *Platycerium grande*.

NOTES ON A VISIT TO GOLD CREEK RESERVE, SEPTEMBER, 1909.

By *G. H. Barker.*

For the benefit of those who may wish at some time to visit the reserve, it would be as well at the outset to make a few remarks on its situation and the means of reaching it. The Reserve lies to the westward of the D'Aguilar range, and south-west of the Enoggera Reservoir, from whose watershed it is divided by one of the spurs of this range. The best, and practically the only route to it is *via* Indooroopilly, Kenmore, and Brookfield, there being a good road for vehicles all the way. The distance from the city by this route is about 12 miles.

Another way of reaching it is *via* Enoggera Reservoir, and thence per bush track across country for about 3½ miles. This, however, can only be recommended to good walkers or to the fortunate possessor of a saddle-horse.

Referring to the main road, the latter part of this, from a scenic point of view, is very fine. It crosses and re-crosses Gold Creek by a number of shallow fords, and is walled in for the most part by high wooded banks, these being in turn varied by the occurrence of a few farms. As one would expect, the dominant botanical note in this part of the road is Lantana and as one nears the reserve it becomes impossible to leave the beaten track on account

of this plant, consequently any items of interest not within reach from the road can only be collected from a flying machine, or passed as "sour grapes."

Once within the reserve, however, the Lantana is conspicuous by its absence, and as one looks toward the head of the lake from the enbankment, the clean and orderly appearance of the banks and bordering lands is noted at once. From the water's edge, a belt of "Water Couch" extends at a uniform width of about 15 feet, right round the lake, and being a much lighter shade of green than the Kangaroo and other grasses, which extend from its edge to the timber line, the effect is most pleasing. Though at one time a great deal of pine was found on the surrounding hills, most of it has disappeared, one or two straggly specimens of *Araucaria Cunninghamii* alone remaining to bear evidence of the one-time forest of this useful tree. On the Southern and South-Western bank the usual Eucalyptus timbered country is noticed, but on the Northern, there is a considerable amount of undergrowth among the timber. Here I noticed a species of Dodonea (Native Hops), which was literally crowded with fruit of a bright pink shade. A Eugenia and *Hibiscus heterophyllus* also flourish here.

At the head of the lake the vegetation assumes the typical scrub form, in places being particularly dense, and it has been a matter for regret with me that I had not the time to do any collecting there. Between this belt and the water a considerable area has at one time been cleared, but now is almost entirely covered by the ink weed (*Phytolacca octandra*), which at this season is in full fruit. On the occasion of my visit there was a strong Westerly breeze blowing, but as this part of the reservoir has a rapid slope to the East, it was quite protected from the wind, and quite calm; I have often noticed in such spots in similar weather, that one hears, perhaps, one of the finest of our feathered mimics, the Silver Eye (*Zosterops coerulescens*). This was one of those occasions, and not only was the weather suitable, but the bird's greatest food dainty grew here in profusion, viz., the ink-weed. This fact had evidently been noised abroad, for the bird was here in thousands, busily feasting and singing. Its note, when mocking others, is not loud or strong—quite the contrary—and it is therefore necessary to be close to the singer to catch the whole score. There is not a bird in the locality that escapes this mimic, and its attempt at such notes as that of the Coach Whip Bird is excellent, whilst birds like the Magpie Lark, the Yellow-faced Honeyeater, and others are imitated to perfection. At intervals it breaks off into its usual warble, evidently as a rest. This bird has a variety of distinctive notes, and in my opinion is the one which goes furthest in using

its voice (if one may call it so) to express its different emotions. I have noticed five of these, as follows :— Firstly is one which may be called a glad carol ; this is its loudest and clearest effort, being usually heard at daybreak on a spring morning, and at the advent of bright sunlight after rain. Secondly come the calls to its kind. To anyone who has heeded these at all, the intonation at once proclaims whether the bird is just starting in flight, or is in full flight ; whether it is wanting to know the whereabouts of others ; or whether it is advising its own position. The first-named consists of one or two short sharp notes. followed by gradually lengthening ones. until they are uttered at regular intervals as the full flight call. Of the two latter, the first-named is a distinct eager thrill, whilst the other is a smooth note. Number three is a note used to express grief ; this I have heard it use when its nest had been disturbed and on the approach of a storm. During the winter these birds are gregarious, but on the approach of the nesting season, this order is changed, and they hunt in pairs. At such time they are almost silent, except an oft-repeated little chirp, which is evidently used to keep in touch with one another whilst foraging. The other note or notes is the power of mimicry referred to above, which is undoubtedly worth hearing at any time. In person, this interesting little bird is unattractive, being attired in dull olive-green plumage, somewhat greyer on the under surfaces. The distinctive mark is a ring of silver-white feathers round the eye.

Another bird whose note I had occasion to remark was the Coach Whip Bird (*Psophodes crepitans*), though in this instance a solitary specimen. At the end of its whip-like note it added two of the notes of the Harmonious Shrike Thrush (*Collyriocincla harmonica*). This I thought was a striking hall-mark of its relationship to the shrikes.

Somewhere in the creek at the head of the reservoir, a pair of Spur-Winged Plover are nesting. These were very jealous of my intrusion, and circled round, uttering their shrill note. They get particularly bold at this time, and though whilst I stood and watched them, they would keep a respectable distance, immediately I turned to walk on they would swoop down quite close.

Among the water fowl to be found here is the little slaty billed coot (*Fulica australis*), two species of duck, a teal, and the usual divers and cormorants. I also noticed solitary specimens of the White Heron and Bittern. On a second visit, whilst exploring the Creek below the reserve, we disturbed a Boobook owl. He decided that we were coming closer than was safe for his health, and started to shift camp. In his hurry, however, he mistook the way out, and became somewhat entangled in the Lantana ; thrashing his way out, he made a good deal

of noise, and this had the effect of attracting the attention of a number of busy tits. They immediately gathered round (at a respectful distance), and made desparaging remarks in no measured terms. As usual in street rows, a crowd soon gathered, who aided and abetted the tits, and if I had not diverted attention by hurling a few big stones into the under brush, under cover of which the owl sailed silently down the creek, he would have had a bad time.

In concluding, I express the hope that these few notes will meet a good deal of attention from the critics, in the course of which much more interesting information of this locality will be brought to light. Should such occur, I will have been amply rewarded.

EXCURSION TO ROCKLEA, 9th OCTOBER, 1909.

REPORT ON ENTOMOLOGY.

Leaders: H. Tryon and E. Jarvis.

The short time available for field-work and dry weather conditions constituted circumstances little conducive to anything but a meagre display of insect life. In the water-holes adjacent to the railway station, in addition to aquatic beetles, were seen five or six varieties of Hemiptera, including at least three different kinds of Water Boatmen, belonging to the genera *Corixa* and *Enithares*, and the very slender larva of a Water Scorpion, *Ranatra*. Under fallen Melaleuca occurred the common small carab-beetle, *Gnathaphanus melanarius*, and the rather diminutive *Avelium nitidum*, whilst in the decaying wood itself three different species of *Erotylidae* were encountered, including the red black-spotted *Episcaphula australis*—all fungus eaters; also an elaterid beetle, evidently predatory on other insect denizens of the same material. In rather drier spots, but still within the area occupied by the paper-bark tea trees, were found, commonly amongst leafy debris, fine examples of the large tenebrionid beetle, *Adelium striatum*, and in the sandy soil itself, just beneath the surface, and ready to emerge, examples of *Scitala* and *Heteronyx*, the former closely resembling the scarabæid beetle that is so destructive to mango blossoms at this time of the year. In the same situation, but where the leaves had given place to a grassy growth, occurred the chrysalis of *Heteronympha merope*—one of the few butterflies that pass the stage in their life referred to beneath the surface of the ground. The imagos were flitting about

close to the earth. very demurely; only examples of the male sex being represented. Interesting Centipedes were also encountered here, of which more anon; save only to remark, that one—a species of *Cormacephalus*—was found feeding upon that noteworthy animal, *Peripatus*. Four different kinds of land mollusca also rewarded our search, a small black slug and an *Helicarion* being the more numerous. Still confining attention to the flat, the foliage of *Melaleuca nolosa* was "worked" for what it would yield. A small bronzy green chrysomelid was found to be the most prevalent beetle in this situation, but a small but rare longicorn was also secured from the same source; whilst a brown plant bug of elongated form was fairly common.

Leaving the flat and proceeding on to higher ground, the quest for insects was pursued amongst some large Eucalypt trees.

In one spot there was a remarkable prevalence of one of our smallest Cicadas, *Melampsalta nebulosa*. Thousands of the empty pupa cases were to be seen attached to the stalks of grass plants, even within our area of a few square yards, and the adult insects themselves were found close at hand, as if recently emerged (E. Jarvis). Another Cicada was also found here, but occurred in much fewer numbers—it was the *Pauropsalta annulata*—and a living pupa apparently of the same species was dug out.

Beneath the loose bark of the Eucalypt trees referred to, were found examples of three different Hemiptera—a rather gaily coloured *Pœcilometis*, in its immature condition; the peculiar *Ptilocnemus lemur*, that has the tibiæ of its hind legs conspicuously fringed, and the red and black bug, *Havinthus rufovarius*, Bergroth. The two latter are alike predatory, and the Havinthus is wont to consume bark-frequenting species of ants, amongst many other insects.

In the same situation occurred, too, examples of a rather pretty bronzy-green clerid beetle, evidently the adult form of some "grub" that exercises the habit of pursuing timber-destroying larvæ within their burrowing—a frequently exhibited feature in this family.

The most "exciting" discovery under the loose bark was constituted by the detection there of the remarkable active Horse-Shoe Cockroach (*Ischnoptera, sp.*), notable for exhibiting, as its name implies, a black horse-shoe shaped mark on its clear white pronotum. An equally active cockroach was found in debris on the flat. This second indigenous blatta was uniformly pale reddish-brown.

On young Eucalypt saplings were also found examples of two very gaily coloured beetles belonging to the family

Cryptocephalidae, one with blue-green patches on its elytra (*C. iridipennis*), and the other an orange-black spotted glossy insect (*C. speciosus*).

On the foliage a lady member found the curious limpet-like larval coverings of the remarkable Psyllid insect, *Spondyliaspis eucalypti* of Dobson.

PRESIDENTIAL ADDRESS

By *Sydney B. J. Skertchly*,

Late of H.M. Geological Surveys of England and Queensland: ex-President of the Royal Society: President of the Child-Study Association, and of the Examining Board of the Institute of Ophthalmic Opticians of Queensland, etc., etc.

THE SO-CALLED "IMPERFECTION OF THE GEOLOGICAL RECORD."

Nascentes morimur, finisque ab origine pendet.
(Manilius.)

I.—*The Problem Stated.*

1.—No educated person at the present day, I imagine, has any doubt that the Theory of Evolution as applied to organic nature is established. We may, we do—nay, we must—accept it as proven that the existing plants and animals are the lineal descendants, the blood relations of those bygone forms entombed in the rocks which we call fossils. The sacred flame of life, lit who can say when, upon earth's altar, burns still; it has been diffused over every land, through every sea, each life-light kindled at the parental hearth, as our blackfellow neighbours used to start the tribal camp-fire with the fire-stick brought from other camps. Descent with modification is the charter written for our learning in the great Herald's College of Palæontology. Vary the metaphor as you will, the truth stands out clear for all to read: Life is the real sacred fire, but whether the spark was lit once and for all, whether simultaneously in many places, or whether Prometheus visited the ancient world at intervals when all was young, it would as yet be rash to dogmatize about. What we may assert with confidence is that each living organism has received its life from pre-existing life, and that the fossils of the Cambrian were the direct ancestors of the beings that now people this planet. The family trees may be incomplete, but it is because some of the testaments are lost, not because they did not exist; and in no case has the property passed out of the direct line.

2.—The palæontological record, though defective, is clear as far as it goes. And this means that the geological record is also clear, as far as *it* goes. It, too, is defective, and it is these deficiencies that we are to look into to-night.

3.—Now Evolution—the doctrine of descent with modification—is a pretty ancient theory. Buffon, aristocrat, courtier, mathematician, naturalist and philosopher, had very clear ideas about it, which he expounded in polished French, veiling his meaning in subtle irony. Lamarck, friend and protégé of Buffon, held very strong and, methinks, sound views on evolution, as you may see in his *Philosophie Zoologique*, if you will read it, and not trust to the unfair excerpts set forth so often as specimens of his handicraft. Alas! folks don't read the works of the great dead; Buffon is treated as a buffoon, and the name of Lamarck has become a by-word to a school of modern English evolutionists, who lampoon him unread. Etienne and Geoffrey St. Hilaire had no doubts about evolution, and, strangest of all, Dr. Erasmus Darwin held clear-cut philosophical views, which (judging by his writings), his celebrated grandson does not seem to have read intelligently, since about all Charles Darwin has to say of him (and this in a footnote) is: "It is curious how largely my grandfather, Dr. Erasmus Darwin, anticipated the views and erroneous grounds of opinion of Lamarck in his 'Zoonomia.'" Not till "Neo-Lamarckians" raised the question did Erasmus receive due credit from Charles, and then in a so-called translation (by Dallas), which cut out much telling matter from the German author's original, and interpolated much he did not say.

4.—About the same time, the close of the 18th and early years of the 19th centuries, Cuvier built the foundations of comparative anatomy on the firm basis of fossil evidence, and laid bare to the astonished eyes of scientists the wonderful mammalian remains of the Paris basin. Meanwhile, William Smith, surveyor, was laying out canals, and incidentally discovering the fundamental law of geology—that the stratified rocks succeed each other in orderly, unvarying sequence, each recognisable by its fossil contents.

5.—The early part of the last century, consequently, gave birth to three fundamental conceptions: (1) the doctrine of descent with modification; (2) the principles of comparative anatomy; and (3) the principles of stratigraphic geology. The world was not ripe for the general acceptance of any of them. Over all brooded the *odium theologicum*, which those who can look back half a century scarce recognize in the mild protests of twentieth century critic-lets. It was rank impiety not to believe that the earth was created at the autumnal equinox, on Sunday,

October 23rd, B.C. 4004. Archbishop Usher had worked it out, and there was no more to be said. If the rocks seemed to tell a different story, so much the worse for the rocks. If Cuvier's fossil mammals seemed to have been even a week older than this, they either lied or were a sort of joke—not real fossils at all. Adam had undertaken, once and for all, the task Linnæus and others long after made such a mess of. He named and classified all the animals, he himself having been born on Friday, October 28th of the same memorable year. How foolish it all seems to us now? But it was very real fifty years ago—a century ago it was well-nigh all-powerful. It is not quite dead yet, this *annus mirabilis*, and the mass of the people still look askance, and whiff sulphur when you tell them man witnessed the last glacial epoch.

6.—The rejection of philosophical ideas by the untrained is natural; but it was the trained philosophers who, as a class, refused to accept the new views. They demanded more evidence. The whole energy of geologists had to be expended in driving home proof on proof of the immensity of time necessary to lay down the sedimentary rocks. At last they hammered the truth in, till now the lad at school babbles of aeons, as if a million years were not a very solemn, and seldom comprehended, thing. Geologists ran riot too, and handled hundreds and thousands of millions as if they were Rockfellers with unlimited credit on the bank of time. Nor were they the only spendthrifts.

7.—Palæontologists opened their own account. True, the stratigraphist needed vast supplies of time to pile his twenty miles of detritus grain by grain: true, that he wanted more than this because his work was intermittent, and there were long periods of enforced rest from the labours of sedimentation. But the palaeontologist required still larger drafts for he required time for the plaeid performance of the duties of life. The stratigraphist must not shoot his sand and mud into the ocean so energetically as to overwhelm the creatures that swam in the waters or crawled upon the sea-bed, or burrowed into it waiting for their daily bread. The sea-floor must be a playground as well as a grave-yard. And so the tale of years was told out without stint.

8.—By the time this was granted, a new wave of thought gathered force. Geology had not only won the battle of time, but palæontology had peopled that time with plant and animal from the muds of the estuaries of to-day, back to the old muds of the Cambrian. And, further, as one delved deeper into the crust, the types of life were found to grow less familiar and, on the whole, simpler. Some ten millions of distinct species, it was shown, had lived, or were living; it was asking too much

to require ten million separate miracles for the creation of ten million separate forms. It became daily more unlikely that time after time the earth had been swept clean. Noah's deluge was difficult enough to accept, but a hundred, may be several hundred, universal deluges were quite unreasonable. Then, too, it seemed such a waste of creative energy to kill off a whole fauna and flora only to create another so like it that one had to employ palæontologists at handsome salaries to point out the differences.

9.—The time was ripening for the acceptance of Evolution. And in the fulness of time came Darwin. October 23rd, B.C. 4004, may be a very mythical date, but there is no shadow of doubt whatever about November 24th, 1859, for on that day Darwin's "Origin of Species" saw the light. It is immaterial whether that form of evolution known as Darwinism is true or not; Darwin's great work was to convert the world to a belief in Evolution. He did not discover evolution; the idea of descent with modification had been steadily making its way for a century. Nor was he alone: Wallace and Hooker (alas, the sole survivors of a race of giants), and many another, were hovering upon the verge, or even breaking within the boundary, of the great theory. But, as all gratefully admit, it was around Darwin and his works that Evolution found an abiding place.

10.—Without, for the present, going deeper into Darwin's views, it is necessary to point out how he and his followers made yet further inroads into the coffers of the bank of time. The Darwin-Wallace theory of evolution, put very roughly, depends upon the accumulation of small, beneficial variations, which in course of time so alter the original form that it becomes a new species. Darwin saw, and constantly emphasized the fact, that this must be an incredibly slow process. In his celebrated diagram illustrating the effects of Natural Selection, he suggests, "a thousand or more generations" as necessary to produce a well-marked variety, and ten thousand generations to produce even an ill-defined species. He tells us, again, that the vast, though unmeasured, period of a whole geological formation may be necessary for the conversion of a slight variety into a new species. Almost every follower of Darwin has written in the same strain; many do so to this day. A few, among them Wallace and myself, years ago sought to shorten this period. We said that the analogy of the present epoch might be misleading, since we are living in times of exceptional geological quietude. But we were scarce heeded, and indeed our knowledge was not deep enough to enforce our views convincingly.

11.—Now, if species do arise by the accumulation of small differences, it follows that between any living species and its parent form, there must have been hundreds, perhaps thousands, of connecting links. And here let me warn you against a pitfall many have fallen into, having first digged it unconsciously. They are always on the look-out for "missing links" between existing species. Such can never have existed—the connection was always down the branches of the tree toward the trunk, and not across from leaf to leaf, or even from twig to twig. Much mis-spent ire has been lavished upon this bogey.

12.—It follows, then, that every species has behind it a line of ancestors, getting less and less like as one goes back in time. There must have been myriads of forms shading into each other, and if the geological record were unbroken, those forms—at least, of the marine species—would lie entombed in the rocks; for though all the individuals would not be preserved, it is not possible to conceive that none escaped preservation during hundreds or thousands, or even millions of years.

13.—Now comes the fact. This continuity of form does not exist. The gaps are far more numerous than the continuities. And the explanation given by all Darwinians, from Darwin himself, in 1859, to Wallace and Ray Lankester, in 1908, is that though the chain itself was built link on link, many, perhaps most of the old links have broken away, and are lost for ever, while many, seemingly lost, only await discovery, like the Theromorphs of Archangel and the Proboscidians of the Fayum.

14.—The series of sedimentary rocks is nowhere complete. There were long periods—chiefly during elevation—when sedimentation was at a minimum, even when denudation overpowered it. The unconformities, we know full well, mark long breaks in time, many of which are not filled in elsewhere, so that the blank is, as yet, total. The imperfection of the geological record is a very real thing; it is the daily lesson of the field geologist. Then, too, much of the earth still remains to be explored geologically, and this makes the recorded geological record more imperfect than nature has done. All these facts I admit to the fullest; forty years and more have kept me on intimate terms with this imperfection in the field. And yet I venture to assert that it is not nearly so imperfect as has been believed.

15.—But before discussing this, let us clearly understand how far we have got in our review:—

(*a*) Geologists have proved from the study of the stratified rocks, from their mode of formation, from the changes in elevation, metamorphism, etc., they have subsequently undergone, the denudation they have

suffered, and the nature of the forces that have operated upon them, that the earth's crust is infinitely older than, say, Mosaic chronology postulates.

(*b*) Palæontologists draw the same conclusion from the study of the life-history preserved in the rocks.

(*c*) Evolutionists, especially of the Darwinian school, are even more insistent; Darwin going so far as to say that unless one is willing to grant a life-bearing time before the Cambrian, equal to that which has since elapsed, the theory of evolution (as he understands it) must be abandoned.

(*d*) The blanks in the chain of fossil life are accounted for by the imperfection of the geological record.

These four conclusions can be compressed into two:—

(1) Enormous time is necessary to allow of the evolution of the present life forms.

(2) The record of the rocks is lamentably incomplete.

This last leads to the ancillary conclusion that if the geological records were complete, we should find innumerable slight links connecting living species with their ancestral stock.

I venture to doubt all this—at least, as at present understood.

II.—*The Real State of the Geological Record.*

16.—The imperfection of the geological record is a glaringly patent fact. Who would care to draw up a flora from the study of the dead leaves that autumn scatters, or a fauna from the chance bones discovered in a forest ramble? But is this a fair statement? Put it another way. Who would care to determine the molluscan faunas of the Queensland coast by the dead shells cast up on the beach? The answer would not only be "most conchologists," but that it is in this way most of the faunas have been determined. Indeed, the difficulty is not in the paucity, but in the richness of the beach deposits, for not only deep sea and shore, but pelagic and even foreign species get washed ashore. One would have to eliminate as many species as one would miss. And, remember, the palæontological record is largely a marine one.

17.—Even with land forms I venture to think that our knowledge in some cases is not so defective as the despairing imperfectionists would have it. If our veteran palæonlologist, Mr. De Vis, were a few years older, and had he collected the marsupials on the Darling Downs with a nullah-nullah while they were alive, I doubt whether he would have bagged more species than he has done by waiting a few thousand years till they were all extinct

and less dangerous. I doubt whether Palæolithic man could have filled a Pleistocene Natural History museum with mammals in the skin more completely than Victorian man has filled the cases at Kensington with skeletons.

18.—I go further. I doubt whether we do not know some of the old faunas quite as well as the modern ones. Take the mollusca once more in illustration. What a minute area the naturalists' dredges have trailed over, and only for a few hours at a time! If they gathered in every living form they encountered they would but capture the individuals that happened to be living on that particular spot at that particular moment. Go over the same ground a month, a year after; can you not add to your list? And after all, the dredge can only bring up the surface forms: it does not dig, it only sweeps. Would not Mr. Tryon or Mr. Shirley gloat if he had the chance of examining a section a hundred feet thick of the sea bottom off our Barrier Reef?

19.—Now this is what the geologist *can* do. He has not to grope blindly for his specimens with a bag at the end of a string. The sea-bottom has come ashore for him, got comfortably dried, and often sliced into convenient sections hundreds of feet thick and hundreds of miles long.

20.—Permit me to use an English illustration, which has many pleasant memories for me. The Pliocene beds (Crags) around Norwich are splendidly exposed in numbers of huge pits in constant work so as continually to expose fresh material, and my old friend Searles Wood, spent a life-time and a fortune in these happy hunting grounds. In mollusca alone he had by 1887 found, figured and described:—

Polyzoa	32 genera	139 species
Brachiopoda	7 genera	9 species
Pelecypoda Monomyaria	7 genera	34 species
Dimyaria	72 genera	224 species
Theropoda	1 genera	1 species
Gasteropoda	83 genera	416 species
Cephalopoda	0 genera	0 species
Total	202 genera	823 species

Can any reasonable being imagine that if Searles Wood had been a contemporary of Pithecanthropus, and collected shells from a Tertiary dug-out, he would have made a better haul? Did Gwyn Jeffreys get a better idea of the shells of the North Sea knocking about the Dogger Bank in a Norfolk ketch during the time his friend, Searles Wood, sat at ease in his study sifting crag sand by the cartload? When to this rich collection we add the almost, sometimes quite as rich, collections from Belgium, France, Switzer-

land, Germany, Austria, Italy, etc., are we not justified in saying that the molluscan fauna of the European Pliocene sea is as well known as that of the North Sea of the present day? Here, surely we have to strain language to find imperfection in the geological record. I will not enlarge upon this portion of the subject; your own observation and reading will supply sufficient illustrations. But I would, in passing, note a bit of valuable negative evidence. Searles Wood in all this opulence of shells found no trace of a Nautilus. Is it not fairer to infer that these cephalopods did not live in that Pliocene sea, than to assume that they did and have not been found? Negative evidence of a certain kind, used judicially, becomes positive evidence. But it is a dangerous weapon save in skilled hands.

21.—Of course, you will say it is not in a single formation that we find great breaks, but in the unconformities between formations. This is noon-day clear. But I shall proceed to prove there is exactly the same class of lacuna in the palæontology of a homogenous stratum as we find in an unconformity. Neither supply the kind of evidence the Darwinian relies upon.

22.—I want to show you there is in many cases clear evidence of unbroken physical continuity with absolutely broken palæontological continuity. Where we get a strong unconformity, as between the Cretaceous and Tertiary in England, accompanied (as it always is) with a great change of fauna, we are justified in appealing to the imperfection of the geological record as the reason why the intermediate forms are absent. So, too, when we find distinct faunas in two conformable beds, say a sandstone and a limestone, we are correct in ascribing the phenomena to the differing physical conditions.

23.—But what is the explanation when we have the same physical conditions, absolutely continuous so far as structure is concerned, and yet a change of fauna? Allow me again to use European illustrations, since the geology of Europe has been so much more completely investigated than that of Australia.

24.—We have many formations which are practically homogenous in physical structure from top to bottom, some a few feet thick, some many hundreds. The Chalk, for example, is pretty pure carbonate of lime throughout its 1,500 feet of thickness. It is softer at the top than lower down; there are thin seams of "pipe clay" here and there a few inches thick. But over thousands of square miles there is not as much mechanical difference as one sees between high and low water-mark on the shores of Moreton Bay. There *is* no break of any importance. Certainly not a break representing those hundreds of thousands, or even millions of years Darwin wants for the

formation of new species. Yet this Chalk is divisible into well-defined zones, each characterized by its own peculiar species. The zones do not merge into each other; the new species come on abruptly above a horizontal line not six inches thick. And this holds true from Denmark to the Crimea.

25.—Take another case from argillaceous rocks. Our Lias derives its name from the "layers" of its mud or clay. These are sometimes so fine as to be called paper shales. They are paper-thin illustrated plates, often so crowded with fossils that not a tenth of a square inch is unadorned. They have been laid down quite gently tide by tide till the separate divisions of the Lias are each a hundred and more feet thick, and one layer is absolutely a replica of another. Here we have proof positive of continuity of deposition and unchanged physical and elimatic conditions. Yet these Lias strata are as severely divisible into zones as the Chalk. One form of Ammonite, for example, goes up to one page of the great volume and stops there, while another and quite new form comes on a hundredth of an inch above. Follow the Lias for hundreds of miles, and these zones do not vary. Where is the room for Darwin's great interval to allow of specific change?

26.—If you say the Chalk and the Lias each represent a long period of time, and so there *was* time for the change, I answer yes, between the top and bottom of the formation, but not in the knife-edge interval between the zones.

27.—But I will take a thin bed, the Gault. It was laid down in a pretty extensive sea spreading over eastern England and western Europe. In England it is seldom over 100 feet thick, often much less. Yet it is quite distinctly divisible into no less than eleven zones, each marked by its own peculiar species that neither began in the beds below nor lived into those above. Where is the requisite time to be found here?

28.—Allow me to use an analogy from light. Every living, every extinct species, must be connected backwards in time to the parent form by infinitesimal gradations, since the crux of Darwinism is that *Natura non fecit per saltum*. The line of descent must be like a continuous spectrum—a rainbow shading imperceptibly from the red to the violet. Cut out any large segment—or unconformity—and you only cause a gap; the remaining portions still are absolutely continuous.

29.—But this is exactly what we do not find. We have no bits of shaded ribbon. We have fairly clear cut lines. We get a spectrum of bright or dark lines, like that of the Sun's corona or photosphere, and never in

palæontology a fragment of the rainbow band one gets in gazing on the moon through a prism.

30.—Now, so far as I know, no one has sufficiently appreciated this particular (and I believe important), yet patent fact in the palæontological record. Its supreme importance will appear further on.

31.—Darwin's magnificent expositions were the immediate cause of the birth of two great concepts. *Ontology*. or the theory that the individual, in its progress from the impregnated ovum to the adult, recapitulated more or less accurately its evolutionary history. And *Phylogeny*. which is the attempt to re-build the ancestral tree by the study of fossil forms. If Darwin had incited nothing more than this he would still stand pre-eminent in biological history.

32.—Singularly, both phylogeny and ontology have failed to fulfill the promise of their advertised programme. Ontogenists, like the delightful Kitchen Parker, have to say, "I seemed to myself to have been endeavouring to decipher a palimpsest, and one not erased and written upon again just once, but five or six times over." He tried in vain to fit natural selection into fact.

33.—Phylogenists in like manner have had to say that "however other folk may find it fit with their studies, it does not tally with my own particular branch of science." But this we will refer to further on. Ontology and phylogeny are both (most likely) true—they only fail when they aim at adapting facts to fictions.

34.—To close this section. I have tried to show that TIME, nay almost ENTERNITY, is the bank upon which a particular school of evolutionists have to draw, and that, quite apart from the physical evidence of the age of the earth, they must account for hundreds of thousands, nay, millions, of years as elapsing between two absolutely identical layers of mud a hundredth of an inch thick.

35.—It is absurd to argue that specific change took place *somewhere else*. Every vertical foot of every geological stratum in every part of the world tells the same story of (apparently) rapid change. Nowhere have these infinitesimal varieties put in an appearance.

36.—When Darwin first cleared the mists away and made evolution a possibility, nay even a fact for us, he was justified in appealing to the imperfection of the geological record. Much of Europe was unknown. America had only been touched. Asia had not revealed any of her hid treasure. Africa was in truth the dark continent, and Australia hardly counted at all.

Much of this is now altered. The gaps, geographically, have been largely filled in, and if so, then we are surely

able to test the question as to whether species have arisen from the accumulation of minute variations or not.

37.—The crucial point is not whether evolution is true. That seems for ever settled in the affirmative. It is the question of the how; whether by slow or by rapid steps, whether per saltum or otherwise, and I believe we can now answer that momentous query.

38.—In the face of all the accumulated knowledge of to-day, no theory can stand which is based upon negative evidence. Half a century ago anyone might formulate any theory leaning on the non-existent reed of the imperfection of the geological record. That intangible possibility is now replaced by a very tangible support which is not negative but positive evidence; but it has the difficult task of attempting to oust accepted theories—ghosts—in which many believe, because they were so taught, and alas! which some find to be lucrative orthodoxy. We have been and are filling in the *geological* gaps rapidly, and the *palæontological* gaps ought to be closing pari passu.

III.—*Mathematic and Geological Time.*

39.—All hypotheses, and most theories, must be in advance of facts. The test of their truth (as distinct from their value as working tools) is that not only do they explain known phenomena, but they point the way to fresh discovery.

40.—Now Mathematic is as progressive as any other phase of science, but neither more nor less exact. The mathematician, however, is like a rain-drop, he must gather about a nucleus. But he has an unholy aptitude for nuclei, and sometimes he piles a brilliant spheroid around an unworthy centricle. But not often. I would that more geologists were mathematicians. To me, if I may be personal, modern mathematical analysis is as music—as symphonies I love and appreciate, but could not compose. I read their wondrous results with delight, and accept all their statements as true deductions *from their premises.*

41.—The mathematicians threw the first bomb among the sleepy geologists and palæontologists and evolutionists who thought their unlimited draft on the bank of time was backed by eternity. In the year 1880, Sir William Thomson (afterwards Lord Kelvin) quietly drove in the geological and biological earthworks by the announcement that their supply of time (like Brisbane's water in the hot season) was to be cut off. And he did it vigorously. He said (and proved) you can't go on drawing upon the sun, because his cash is running out, and you mustn't delude folk with the idea that he was always your banker, because a few million years ago you and your

forbears were not here to have an account at all. He gave us a few hundred million years but afterwards cut it down to some thirty or at most fifty million.

42.—Huxley went out to fight this Goliath with a pebble—that is, a small geological specimen. Now, Huxley's conclusion, in my opinion, was the correct one, but his argument was so utterly feeble and beside the mark that Sir William first ground it to powder, and then blew it away at a breath. Both parties were right; but Kelvin stood on firm ground, and the other didn't and couldn't see the hard rock his opponent stuck his heels into.

43.—Palæontologists and evolutionists had to pull up short. It was no use girding against equations. Their long-drawn genealogies had to be compressed or abandoned —and they knew those genealogies, in the main, were honest though they might not be quite so lengthy as was fondly imagined.

44.—But Lord Kelvin did not dogmatise. He said that *if* the Sun went on losing heat at the present rate, and *if* its fuel were not replenished, then his fires must assuredly burn out within a limited number of years, say four or six million years, and just as certainly can they only have been lit some twenty million years previously. This is his latest estimate (1889).

45.—But there was a fuel that would largely replenish the Sun, and it was discovered just ten years after Kelvin's pronouncement. In Radium, we have, it seems pretty certainly, a heat-generator sufficiently powerful to keep the Sun going a good many million years. Perhaps, it has kept it going for as long a period as palæontologists sigh for. but on this point I suspend my judgment. It may be that radium as an element is not very old as elements go. But this is outside our prescribed limits.

46.—What I wish to make plain, and I can't find anyone who has yet realised the vital point I am aiming at, is that *even if the Sun and Earth were infinitely old it would not help Darwinian evolutionists one tittle.* What they really need is an explanation not of such gaps as are clamantly heralded by unconformities, but of those palæontological gaps in conformable strata on which I have been insisting. No lengthening of days has any bearing upon the changes of species within time represented by the continuous deposition of a film of mud no thicker than a visiting card.

47.—Some ten years ago, Prof. George Darwin, son of Charles Darwin, showed that the day is shortening by a fraction of a second in a thousand years, and the Moon is leisurely receding from us. Calculating back, he found the moon was once in contact with, that is formed part of, the Earth. But G. Darwin did not, so far as I recollect

(his paper is not immediately available), draw any conclusions as to the effect of this upon the life-history of the world.

48.—Sir Robert Ball, on the other hand in books and in lectures (with funny mechanical slides, too) has averred that even as late as the Silurian the day was but four or five hours long, and consequently raging tides of colossal magnitude swept round the world in two or three hours.

49.—Now, this I emphatically deny. Every first-year student of geology can prove its falsity. What sort of higgledy-piggledy would our strata present if every drop of ocean were racing at a pace which at the equator would be about 8,000 miles an hour! We *know* that the Cambrian rocks, in which the earliest known forms of life appear, were laid down in waters as placid as those now playing upon Queensland's shores.

50.—Admitting, as one must, G. Darwin's mathematical conclusions, we as geologists are sure that the conditions he postulates must have ante-dated the whole of stratigraphical time. Sir Robert Ball erred as much in limiting time as evolutionists had done in extending it. And I would call the attention of mathematicians, physicists and astronomers to the great fact that from Cambrian times at least the world has jogged along pretty much in the same fashion, and therefore the Sun, through a fair number of millions of years does not seem to have lost much of its energy. Henceforth, these mathematicians, to whom we owe perhaps the deepest of all debts, must take this great geological fact into consideration in dealing with questions relating to the age of the solar system. But, though tempted, I must refrain myself in this connection.

51.—Neither dare I tax your patience with a criticism on the bearing of the splendid deduction of my old mathematico-geological friend, the Rev. Osmond Fisher, that the basins of the great oceans are areas which supplied the matter of the moon. In like manner, I must refrain from noticing Prof. Love's splendid harmonic analysis of the distorting powers of the sun, moon and planets in determining the configuration of ocean and continent. Both are germane to our enquiry, but I at any rate, must to-night set a good example in economising time.

52.—What I have striven to show is, *firstly*, that geological time is strictly limited. It cannot have begun till the earth had slowed down, so that the tides were tamed. *Secondly*, that lengthening the span of life would not in the least affect the evolution problem as formulated in the rocks. *Thirdly*, that the birth of species must often, nay generally, have been quite a rapid process, for in no other way can we read the testimony of the rocks.

Permit me to illustrate this last proposition a little more fully, and you may go home having made a record exhibition of the Stoic virtue, patience.

IV.—*The Testimony of the Rocks.*

53.—I can only briefly sketch the results of palæontological research, and if I take selected examples, believe me, I have not cared to seek the strongest evidence; every geological formation, every group of animals and plants proclaims in clearest language that evolution, as a whole, has *not* been gradual, but in rythmic and often rapid waves. We must eliminate the fatal *Non* from the favourite axiom about *per saltum*. The truth of a theory is established when not only old facts, but new ones, fit into it; a theory is not necessarily wrong, because the gaps are still open, but you must not drive square pegs into round holes, and think you have made a neat job of it.

54.—When Mendeleef insisted upon the periodic law of the elements, the cautious said, "Behold your curves are faulty." Not so, he replied, the faults are gaps due to the imperfection of the chemical record; and gallium and many another unknown element, even up to those weird chemical elements without chemical properties that my friend Sir Wm. Ramsay extracted from the breath of our nostrils, fitted exactly into the places awaiting them in the periodic scale.

55.—Now I affirm unhesitatingly, that while the imperfection of the geological record has rapidly diminished, not one gap has been filled in according to the supposed law of natural selection. But every gap that has been filled has been in accord with the theory of evolution.

56.—At first, while Darwinism rightly held sway, the new discoveries seemed to be just what was wanted. How we all hugged ourselves when one, two, three, and finally four fingers and toes were added to the horse! Here, indeed was evolution: but here, as certainly is not gradual evolution: the steps are very wide apart; they are of generic magnitude, and not the tiny graduations that lead insensibly from, say Equus to Hipparion. We misread our gaps as if from the gapped fossil inscription:—

N R L CT N

we filled it in—

NATURAL SELECTION.

Whereas it should be—

NOT REAL SELECTION.

57.—Take any group of animals, and it will be found that as we trace them backwards, in time they grow simpler or less specialized. This is evolution. Next, it is clear that in the life history of each group, "each advance has

been marked by the fixed and definite acquisition of some new character—an 'expression point,' as Cope termed it, which seems to have rendered possible, or, at least, been an essential accompaniment of a fresh outburst of developmental energy."

58.—Dr. Smith Woodward, from whom I quote, in a masterly sketch of the history of Fishes, shows they had four such expression points, the acquisition of :—

1. Paddle-like paired fins ;
2. Shortened fin-bases, but persistent heterocercal tail ;
3. Completed balancing fins and homocereal tail ;
4. Completed internal skeleton.

He proceeds in words so exactly expressing what I am endeavouring to inculcate, that I will quote him in place of using my own words :—

" When fossils are examined more closely, it is interesting to observe that the geological record is most incomplete exactly at these critical points in the history of each race. There are abundant remains of the families and genera which are definitely referable to one or other order or suborder ; but with them there are scarcely any of the links between these major divisions which might have been expected to occur. It must also be confessed that repeated discoveries have now left faint hope that exact and gradual links will ever be forthcoming between most of the families and genera. The 'imperfection of the record,' of course, may still render some of the negative evidence untrustworthy ; but even approximate links would be much commoner in collections than they actually are if the doctrine of gradual evolution were correct. Palæontology, indeed, is clearly in favour of the theory of discontinuous mutation, or advance by sudden changes, which has lately received so much support from the botanical experiments of H. de Vries."

60.—What is true of fishes is true of all other groups. That theory is indeed feeble which relies upon the imperfection of the geological record at every crucial stage !

61.—Everywhere, also, we find great and sudden outbursts of developmental energy. Such, among many, are the sudden appearance of the Carboniferous flora and of dicotyledonous plants in the Cretaceous, of Dinosaurs and other Reptiles in the Trias, of Ammonites in the Jurassic, of Nummulites in the Eocene, of Mammalia at the same epoch, and of Marsupials in the Australian Pliocene. These are universal phenomena in time and space, great cosmic events—and not the slow creeping action demanded by Darwinians.

I would fain write more on these points, but I of all people must be a conservator of time.

62.—The conclusions I have put before you, I ask you to ponder over at your leisure—they cannot be decided upon without much thought. I know they have some strain of novelty, I believe they lead towards the light.

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Queensland Naturalist.

THE ORGAN OF THE FIELD NATURALISTS' CLUB
AND ITS BRANCHES

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PROCEEDINGS.

EVENING MEETING, 31st MARCH, 1910.

Chairman : W. R. Colledge. Attendance, 18.

Election : H. C. Richards, M. Sc.

Report : Excursion to Sandgate. Ornithology and Entomology, by R. Illidge and H. Tryon (*vide* Transactions, p. 144).

Papers : "Notes on the Life-History of *Spodoptera mauritia*," by Edmund Jarvis (*vide* Transactions, p. 146) ; "Birds of the Glass House Mountains District," by W. Weatherill (*vide* Transactions, p. 156) ; "Note on the Nesting Habits of *Pseudogerygone cantator*," by W. Weatherill (*vide* Transactions, p. 151) ; "Notes on a peculiar habit displayed by the Mantis (*Archimantis latistylus*), by Horace Brown (*vide* Transactions, p. 152).

Exhibits : Insects collected at Sandgate, by R. Illidge and H. Tryon. Specimens illustrating Notes, by Edmund Jarvis and Horace Brown. Butterflies and Moths, by E. K. Shearwin.

EXCURSION, 9th APRIL, 1910.

Goodna—Eleven members present. Leaders : W. R. Colledge and C. White.

EVENING MEETING, 28th APRIL, 1910.

Chairman : W. R. Colledge. Attendance, 20.

Reports : Excursion to Goodna. Pond Life, by W. R. Colledge.

Botany : By C. White.

Paper : "Meteoric Stones, with Reference to Discoveries in Queensland," by H. Tryon.

Exhibits: Drawings of Rotifers, taken at Goodna, by W. R. Colledge. Plants from Goodna, by C. White. Cast of a scale of *Ceratodus Forsteri*, measuring $6\frac{3}{4}$ inches by $4\frac{3}{4}$ inches, by J. Lamb. Fruit of *Monstera deliciosa*, by J. Wedd. Interesting lizards, *Trachysaurus rugosus* (alive), and *Hinulia* (two-tailed), by H. Tryon, who explained the circumstances under which two tails arose in certain lizards and how the phenomenon was brought about, referring especially to Gadow's observations, and also the more interesting facts concerning the former reptile. Living Rotifers (*Trochosphera æquatorialis*) under the microscope, by W. R. Colledge.

EXCURSION, 30th APRIL to 2nd MAY, 1910.

Glass House Mountains: Twenty nine members attended a camp of three days' duration. Leaders:—Botany, J. Shirley, B.Sc., J. Wedd and C. White; Entomology, R. Illidge and H. Tryon; Geology, B. Dunstan and H. C. Richards, M.Sc.; Pond Life, W. R. Colledge.

EVENING MEETING, 26th MAY, 1910.

Chairman: W. R. Colledge. Attendance, 27.

Death of the King: A resolution was passed expressing the Club's sorrow at the death of His Majesty King Edward VII., and its sense of the great loss to the Empire suffered thereby.

Election: F. Daniel and C. R. Morton.

Reports: Excursion to Glass House Mountains—(*a*) Entomology, by R. Illidge (*vide* Transactions, p. 153); (*b*) Botany, by J. Wedd and C. White (*vide* Transactions, p. 154); (*c*) Pond Life, by W. R. Colledge (*vide* Transactions, p. 155); (*d*) Termites (White Ants) and Chilopodous Myriapoda, by H. Tryon (*vide* Transactions, p. 155).

Paper: Descriptions of two new Batrachians, by J. Lamb. (Withdrawn for publication in Annals of Queensland Museum).

Address: "Observations on Insect and Bird Life at Nerang," by S. B. J. Skertchly.

Exhibits: Insects from Glass House Mountains, by R. Illidge and H. Tryon. Plants from Glass House Mountains, by J. Wedd and C. White. Snake-like Lizard (*Pygopus lepidopus*) from Glass House Mountains, captured by Master J. C. Andrews, by H. Tryon. A Snake (*Vermicella annulata*) from Southport, Q., by W. R. Colledge. A rare snake (Hopocephalus), captured in William Street, Brisbane, by H. Tryon, who stated it did not accord with any species described by G. Krefft. Two Giant Phasmidæ (*Acrophylla titan and Cyphocrania golialth*), by H. Tryon. Mr. J. Lamb, in further

reference to two—or more—tailed lizards adverted to by H. Tryon at the last evening meeting, mentioned an instance of a lizard (*Egernia striolata*) developing a new tail in place of one that was bitten off, on 13th April, 1910, by another lizard (*Tilqua scincoides*). On 20th June, after an interval of little over 2 months in our winter season, the new tail was 33 m.m. in length.

Mrs. Compton Andrews and Mr. Edward Colclough exhibited a large number of sketches made by them during the Club's excursion to Glass House Mountains.

EXCURSION, 11th JUNE, 1910.

Upper Ithaca Creek.—Attendance, 7. Leaders, G. H. Barker and C. White.

EVENING MEETING, 23rd JUNE, 1910.

Chairman: W. R. Colledge. Attendance, 13.

Election: Mrs. Compton Andrews, Miss L. de Tuetey, Miss W. Dickson, Miss B. Ludgate, L. Blake, K. Swanwick, R. Varney.

Report: Excursion to Upper Ithaca Creek, by C. White.

Exhibits: Ten different kinds of Eucalypts from Upper Ithaca Creek, by H. Tryon, who described their chief characteristics. Plants from Upper Ithaca Creek, by C. White. Fossils and limestone from vicinity of Yarrangobilly Caves, by Miss R. Phillips. Aquatic plant (*Azolla rubra*) from lagoon near Seventeen Mile Rocks, by S. B. J. Skertchly. Fruits of the Queensland Nut (*Macadamia ternifolia, F. v M.*) and a new species *M. minor*, Bail., *Queensland Agricultural Journal*, Vol. XXV., p. 11, for comparison, by C. White. The fruits of this latter species have a somewhat bitter taste, which Mr. Tryon remarked was propably owing to the presence of hydrocyanic (prussic) acid, yielding glucoside, which has been found by J. C. Brünnich in large quantities in the kernels of *M. Whelani*, Bail., a North Queensland species.

TRANSACTIONS

REPORT ON THE SANDGATE EXCURSION—12th MARCH, 1910.

ORNITHOLOGICAL AND ENTOMOLOGICAL NOTES.

By Messrs. H. Tryon and R. Illidge.

Field observations were commenced in the vicinity of the larger of the two swamps immediately to the North of the town. One of the first insects encountered was the large and peculiar ant, *Bothroponera piliventris*, *S.m.*, an insect that occurs in small communities in the soil and is peculiar in so much as it emits a mass of froth from its tail-end—the product of a special gland. At the foot of the tree where it occurred was met with also the interesting but common Bombardier Beetle (*Pheropsophus verticalis*), which also discharges with a loud report a fluid substance from its tail-end in the form of a cloud-like vapour of a yellow colour. And under the bark of the same tree occurred also in numbers one of the most diminutive of our Click Beetles (*Elateridæ*) and a handsome though baneful looking *Gryllacris*. Close at hand an old and much weathered log was perforated all over by the beetle, *Phoracantha gigas*, that had made these holes in issuing; and some of them were stuffed with small bunch-like fragments of grass, the work of another evidently quite unrelated insect.

The swamp itself presented a special attraction, insomuch as it was alive with birds. The Reed Warbler (*Acrocephalus australis*) welcomed us with its melodious song, and the Mangrove Kingfisher (*Halycyon sordidus*) invited its mate to meet the party—in strident notes. The remarkable Jakana (*Parra gallinacca*) stalked over the water surface, extending its long toes athwart the floating Nymphæa leaves, but again and again bobbing its body up and down as it progressed, as if to tumble in. Gliding along lanes, intersecting the rushes, were examples of Black Duck, Teal and Moor Hen (*Gallinula tenebrosa*), enjoying the security provided for them—for it may be remarked that the swamps are reserves for the preservation of birds. And over masses of these leaves walked leisurely large Blue Water Rail (*Porphyrio melanotus*), otherwise known as Red Bills; with sudden frequency, raising their short tails

to reveal their white under tail-coverts. Later on these birds visited the fore-shores of the swamp to feed on the tender herbage, in troups of a dozen in some instances. A solitary small Bittern—of undetermined species—flashed before its features could be scrutinized, and flew just over the open water. And, as if resting from a protracted flight, or, it may be, bent on sunning themselves, small flocks of Fairy Martens reposed on certain reed-masses.

In contrast to this wealth of the feathered tribe that the swamp presented, the poverty in this respect of the surrounding bush—open to the slaughter effected by the votaries of the pea-rifle—was noteworthy: few birds other than Australian Minahs (*Manorhina garrula*), one or two Butcher Birds (*Cracticus*) and Rufous-breasted Thickheads being met with.

The waters of the swamp were not explored for insect denizens, except incidentally by the President in studying "Pond Life." But the lovely Blue Water-lilies (*Nelumbium giganteum*) had experienced great damage from the caterpillars of *Paraponyx depunctata*, Guerin, this peculiar water-loving insect—almost as transparent as the water itself—occurring in places in numbers beneath every leaf, living securely under the protection of fragments of their special food-plant, which by glutinous threads they had fastened to these. [*Note.*—The special interest connected with the aquatic habits of *Paraponyx* was dwelt upon by one of us at an earlier meeting of the Club].

In the vicinity of the swamp patches of Tea-Tree (*Melaleuca*) brush, as well as "suckers" of *Eucalyptus tereticornis* grew, and these yielded numerous insects. The former were being consumed by sand-fly larvæ (*Perga* sp. sp.), but only one adult insect was captured. They also yielded caterpillars of the stinging caterpillar, *Doratifera*, as well as the pretty plant-eating beetle (*Cryptocephalus speciosus*) and a handsome caterpillar of a large pyrale, living solitary in the folded-up leaves. The Eucalyptus supported not only the beetle mentioned, as well as the *Doratifera*, but a second species of the same moth-genus. With the latter plants grew clumps of *Wickstrœrnia indica*, and the foliage of the plant was extensively injured by the caterpillars of the pyralid moth (*Pyrausta violacea*).

On beating the numerous bushes forming a brush on the hillside facing the swamp, a few phytophagous beetles and some additional saw-fly larvæ were met with. Also examples of more than one kind of the phaneropterid locust genus (*Cœdicia*), including *C. longipennis* and the related *Symmachis lactipennis*. Passing on to the higher ground to the North, the bushes yielded additional examples of small Curculionidæ and leaf eating beetles proper. Here also was taken an example of the beautiful *Acrophylla*

violascens—a female individual. This phasmid has been of very rare occurrence for a number of years past, although formerly by no means a scarce species. It illustrates very well the remarkable dissimilarity often occurring between the male and female insects in the phasmid group, the male having violet and the female red under-wings, and in other respects the two are strikingly distinct. Amongst the leaf-eating beetles (*Phytophaginæ*) found in this situation was a single specimen of a *Paropsis*, exhibiting strangely beautiful colours, and which, if not already named, might be entitled *Paropsis splendidissimus*.

The head, antennæ and pro-thorax pale luteous, somewhat translucent; two round black spots on each side of pronotum; margins of elytra and scutellum also luteous; disk of elytra pale carmine-red, having four large oval spots, two basal and two median, of a rich pearl-like lustre, with reddish or golden tinge. The two basal spots are bordered externally and internally with black; the median have a black spot basally near the suture, and a black band apically. Above the latter's margin is a crenulated black line which borders two semi-circular similarly coloured spots to those on disk. These spots are narrowed out and form a continuous submarginal line to apex. Near the apex are two round spots of glowing orange bordered with gold, and above these are two oval spots of similar colour, also bordered with gold, just touching the median spots before mentioned. The under surface is entirely luteous. The insect was beaten by one of us (R. Illidge) from a small Eucalypt with large glaucous green leaves.

Note.—In the present insect, as in other species of Paropsis, the characteristic colouration disappears after death. The appearance of the living *P. splendidissimus* may therefore be fittingly appended.

NOTES ON THE LIFE HISTORY OF SPODOPTERA MAURITIA (Boisd.), Hampson.

By Edmund Jarvis.

Description of Egg.

Colour: Light pinkish-yellow.

Form: Somewhat depressed, and laterally carinated around middle, with area above carination ribbed longitudinally. Basal portion slightly flattened where attached to leaf, and apical portion hemispherical.

Horizontal diameter	..	$\frac{3}{8}$ m.m.
Vertical diameter	..	$\frac{1}{4}$ m.m.

Description of Larva.

The following short description of the early moults may be useful as an aid to the identification of the young larvæ:—

When just hatched: Pale yellow; dorsal area of anterior segments pink, with first thoracic segment brown and slightly swollen. Head, dark brown and shining. Prolegs, brown. Body covered with scattered colourless hairs, arising from minute dark blotches. Length, $1\frac{1}{2}$ m.m.

Eight days old: Pale green, with narrow white centro-dorsal and subdorsal lines. Segments edged transversely with lighter colour, giving a somewhat barred appearance to the body. Head, very light yellow, with pale red eyes. Length, 5 m.m.

Twelve days old: Greenish-brown, marked with irregular spots and dashes of darker colour. Centro-dorsal line replaced by a band consisting of three somewhat suffused lines, the middle one reddish-brown, and the others dark-greenish brown. Subdorsal lines replaced by yellowish-green bands containing a narrow, suffused, reddish brown line, noticeable chiefly on anterior and posterior terminal segments. Spiracular area traversed by two broad bands; the upper running upon spiracles, edged with dark brown, and enclosing spots and irregular markings of the same colour: and the lower containing reddish-brown marks enclosed by two whitish lines. Ventral area yellowish-green, covered with dots of a lighter colour. First thoracic segment deep reddish-green, with dorsal and subdorsal lines yellow. Head, greenish-brown: face, dull yellow. Body tapering slightly towards head and anal segment, and bearing a few scattered short brown hairs. Length, 14 m.m.

Description of Fully Grown Larva.

Eighteen days old: Greenish-brown, covered—except on dorsal area of first thoracic segment—by innumerable short streaks and wavy lines. Centro-dorsal band light and hardly noticeable. Subdorsal and spiracular bands yellowish, the former being the lighter and more pronounced, and having a dark line on its lower edge; and the latter being placed immediately below spiracles. Anterior dorsal portion of each segment (except first thoracic) inclosing two strongly marked, somewhat triangular-shaped, velvety-black patches, situated just below the centro-dorsal band, with their longest sides forming part of the upper edges of subdorsal bands. (*Note.*—These black patches are subject to variation, and in some specimens appear as short, thick streaks, or exhibit less intensity of colour). Dorsal area of first thoracic segment dull bluish-brown, with a few suffused, irregularly placed, faint reddish spots; and yellow centro-dorsal and subdorsal lines, the latter being the broader. Spiracles, dark brown. Ventral surface, greenish-yellow. Head, greenish-brown, with face yellow between eyes, mandibles dark red, and labrum light yellow. Body cylindrical, tapering slightly at each end, and bearing a few short, scattered black hairs. Length, ·28 m.m.

PUPA.

Almost black, with some of the abdominal basal segments dark red on ventral portion. Anal segment ending in two sharp spines. Length, 18 m.m.

Life History Notes, etc.

Egg: The eggs of this moth were found on the under surface of an Oleander leaf, about five feet from the ground. They were laid side by side to the number of 60 or more, occupying an area of about 15 m.m. by 5 m.m. ($\frac{5}{8}$ths of an inch by $\frac{3}{16}$ths), and were covered by a pale pinkish-brown, felt-like substance, composed of fine hairs. This habit of hiding eggs under a layer of down stripped from the abdomen is practised by other moths, such as species of the genera *Teara* and *Limacodes*. Species of lepidoptera that deposit one only, or a few eggs at a time (*Papilio* and *Antheræa*, etc.), do not as a rule take as much precaution for their preservation as others that lay a number in a batch; but it is interesting in this connection to notice that in cases such as that, for instance, observable in some of our large wood feeding moths (*Hepialidae*)—which do not in the strict sense of the term lay their eggs, but appear to eject quantities at a time in a loose condition—this exceptional habit is not followed by effects detrimental to the persistence of the species; a fact which may be accounted for by the vast number of eggs produced by one female (often amounting to tens of thousands) and their minute size, inconspicuous colouration, and seed-like appearance. The eggs of *Pielus hyalinatus* might easily be mistaken for the tiny seeds of the "Snapdragon" (*Antirrhinum*) or Tobacco. I have more than once observed the eggs of *S. mauritia* on "Camphor laurel" leaves (*Cinnamomum camphora*), but oftener on Oleander, and in every instance noticed that grass (one of the food-plants) was growing plentifully under such trees or bushes. The batches are not always oblong in shape, but occasionally nearly circular, like those laid by *Limacodes longerans* on the foliage of Eucalypts; and each female propably deposits from six to eight, producing in all about 350 to 400 eggs.

Larva: The larvæ are sluggish, and of omnivorous tastes, feeding mostly at night on various kinds of grasses, and doubtless attacking a large variety of other herbaceous plants.

IMAGO.

This moth affords a somewhat interesting illustration of a small section comprising species that—unlike the majority of lepidopterous insects—do not deposit eggs upon the food-plant of the larva. In the present instance it seems probable that the above-mentioned omnivorous tastes of the larva are partly responsible for the acquirement of a habit that might at first sight look like indifference on the part of the imago for the welfare of her offspring, but which in reality will, upon investigation, be found to be quite the reverse. The following notes, tendered in possible explanation of some of the motives influencing

the perfect insect in the choice of such a situation for her eggs, will perhaps throw a little light upon the question :—

We may reasonably infer that a position on the leaf of a tree or shrub several feet above the ground would be safer than one close to the earth on the leaf of a food-plant, where the eggs would be more likely to be interfered with by ants or other insect enemies, and might also run the risk of being eaten by herbivorous animals. Possibly the moth considers a leaf more convenient, for her purpose, than a blade of grass, as the broader surface of the former allows ample space in any direction for the quantity of eggs deposited, and, being more rigid than a yielding grass-blade, would give a firmer foot-hold, a matter of some importance perhaps when we reflect that it must take a little time to lay sixty or more eggs, and cover them in so careful and clever a manner. It is natural too to suppose that she would wish to be undisturbed during the operation, and an elevated position amongst the leaves of a shrub might afford more seclusion than would easily be obtainable in some other situations. Such position, however, whilst proving to a certain extent beneficial to the eggs, would undoubtedly offer greater chances of preservation for the young larvæ, which, when hatched, let themselves drop into the air on silken threads, and reach the grass by allowing the wind to separate and carry each to the ground in different directions : whereas if they had to emerge from eggs laid close to the earth on the food-plant, such obvious aid to an effective and rapid dispersion would be out of the question, and a period of exceptional danger inevitably occur, during which the entire mass of weak and defenceless caterpillars could easily be destroyed by the first prowling enemy that might chance to discover them.

The times spent in the larval and pupal stages are as follows :—

Larva, 27 days. Hatched, 6/4/9 : Pupated, 2/5/9.
Pupa, 21 days. Pupated 2/5/9 : Moth emerged, 23/5/9.

Unfortunately I have had no opportunity of ascertaining the duration of the egg stage ; but, presuming it to last a couple of weeks, we may conclude that specimens of the late summer brood take about two months to develop from the egg to the perfect insect.

The following note, in which Mr. H. Tryon has kindly drawn attention to the principal literature dealing with this moth and a closely allied species, adds considerable interest to the subject :—

Note : by Henry Tryon, Government Entomologist.

When the facts in the foregoing article were communicated by its author to the Club, I ventured to suggest that they related to an insect other than *Spodoptera mauritia*,

Boisd., and I was at first confirmed in this opinion when the moths to which they actually related were brought to my attention, for I had been led to associate with Boisduval's species *Mauritia*, a moth agreeing with Sir G. F. Hampson's description of and "figure 140—*Spodoptera mauritia* male" in his "Moths (The Fauna of British India, II., p. 249, 1894), and amongst other characters in lacking "the very large tufts of hair and scales from outside" of the fore-tibiæ in the male, and according with it in damaging members of the grass tribe: an insect occurring in India, and agreeing—according to Hampson—with this figure and description also, destroying growing rice there ("*Indian Museum Notes*," V., p. 48, 1900).

The insect dealt with by Mr .Jarvis was labelled in all local collections *Spodoptera acronytoides*, Guen: but Dr. J. Turner—the Queensland authority on the Heterocera—pointed out to the writer, that in the British Museum moth collections, of which Hampson is keeper, this really bore the title of Boisduvals species now mentioned. Hence in the Department of Agriculture cabinets it bears both names. Since the Club's meeting, Vol. VIII. of the monumental "Catalogue of the Lepidoptera Phalænæ" has been received here, and its learned author (Sir G. F. Hampson) decided therein, (1) that our *S. acronytoides* is really *Spodoptera mauritia*, Boisduval, the two names being synonymous (*Op. cit.*, pp. 257, fig. 66); and (2) that the insect we have regarded as *S. mauritia*—misled in my case by his figure—is *S. exempta* (Walker), or as he now terms it *Laphygma exempta* (Walker), Hampson. Accordingly the suggestion alluded to is untenable.

Both insects have an almost co-extensive range in Australia, and are of wide distribution beyond its limits, often occuring associated in the same area. They are, in their caterpillar phases at least, evidently allied in their form, structure and habits.

I can recall but few instances of the early stages of *Spodoptera mauritia* being described, and its being placed amongst serious insect pests. Its life history has been recently worked out in Hawaii by O. H. Swezey, who styles it "The Grass Army Worm" (*cf.* Bull., 7 Div. Entom., H.S.P.S. Expt. Station, 1909, pp. 13-15, Pl. II., figs. 7-11—egg. egg-masses, caterpillars, moth). W. Van Deventer has also both figured and described the caterpillar and moth ("De Dierlijke Vijanden van het Suikerriet," 1906, p. 109, pl. 17, figs. 1 and 2). Both Swezey and the latter author deal with its very injurious relations with the sugar cane.

Mr. Jarvis' independent observations regarding the life-history of the insect under consideration confirm in an

interesting manner those of the Hawaain investigator. These had not come, in fact, under his notice when making them.

In Queensland it has not been *Spodoptera mauritia* (Boisd.), Hampson, that has manifested itself in the caterpillar phase of life as a "Grass Army Worm," although this insect is always of very common occurrence, but *Spodoptera exempta* (now *Laphygma exempta* (Walk.), Hampson). It was the latter insect that was so exceedingly destructive to pasturage in certain parts of the Moreton District in February, 1898, and which formed the subject of official report, on my part, at the time. This has also been the case in New South Wales, as will appear from the illustrations accompanying W. W. Froggatt's article, "The Caterpillar Plague," relating to an occurrence there contemporaneous with the Queensland one: for although he names—on the authority of O. Lower—the insect implicated *Phlegetonia carbo*, Gn., it is undoubtedly *L. exempta* (Walk.), Hampson, as he has since pointed out ("Australian Insects," p. 266.)

And it may happen that since both the insects, as is stated to occur in Hawaai, and the method of distributing the egg-masses in *S. mauritia*, brought to light by both Messrs. Swezey and Jarvis, do not suggest any large congress of caterpillars, that it was *S.* (*L.*) *exempta* that actually figured in the former existence of an Army Caterpillar there.

It may be of interest to add in conclusion, that in New South Wales and Queensland alike, repetition of the caterpillar plague, until at least several succeeding seasons had elapsed, was rendered impossible owing to the caterpillar being heavily parasitised by the Ichneumon (*Rhyssia semipunctata*).—H.T.

NOTE ON THE NESTING HABITS OF THE QUEENSLAND CANARY.

Pseudo gerygone cantator (Weatherill),

By W. Weatherill.

The observations briefly recorded below have reference to the bird that was described by the writer as a new species at a previous meeting of the Club (*vide Queensland Naturalist*, p. 74), and were made in the gardens of the Queensland Museum, where it had selected the dependent leafy branches of a weeping fig (*Ficus Benjamini*) as the site for its nidification. The form and composition of the nest itself has already been described (Weatherill.) On the 15th September the foundation of the structure was placed in

position, and on 25th the nest was completely formed, lacking only the lining. From the 25th to 27th inst., the birds were seldom to be seen. During the 28th inst., however, they were back again to their work, singing frequently in a most enchanting manner and completing the lining of their nest. On the 1st October a single egg was laid, and one each on the two following days. Between these dates and the 19th incubation was pursued when two of the eggs hatched, tho third "cantator" coming forth on the night of 19th-20th October. Unfortunately both nest and young now received the attention of the introduced sparrows that destroyed one and the other.

A PECULIAR HABIT DISPLAYED BY THE MANTIS.

Archimantis latistylus (Serville).

By Horace Brown.

Note.—The observation that formed the subject of a verbal communication through H. Tyron related to the interesting manner in which the insect performed its toilet, even when stationary in its captor's hand, and that was suggestive of some of the acts subserving the same purpose displayed by the domestic cat. For example, it would hold its antenna alternately by means of the tibia and femora of tho forelog, closed one against the other, and then pass it joint by joint under the action of its mandibles and maxillæ, and so with other parts. And in other rospects, the insect formed an interesting "pet"; engaging in various curious operations without evidence of terror. It also was remarkakle for the site chosen by it for containing its "Ootheca" or "Egg Mass." Ordinarily our larger Mantidæ, amongst which it might be included, attached these curious objects to the more slender branches of trees or bushes, usually selecting ones already dead. The Archimantis, however, resorted to tho ground for tho purpose of building the Ootheca—of the ordinary spume—in some crevice in the hard soil, *e.g.*, amongst stones embedded therein, the substance of this being of a honey-yellow colour and externally brown, whereby its concealment was better effected. Mr. Brown's observations were made at One Tree Hill (Mt. Coo-tha), noar Brisbane. In the same situation a very youthful student of Nature (Master Tiegs) had observed an *Archimantis latystylus* with its hind-body partly inserted in a crevice in the top of an old post-hole, and on removing it had found that it already nearly completed its egg-mass that it had elected to place in this situation.—H.T.

REPORTS ON EXCURSION TO GLASS HOUSE MOUNTAINS, 30th APRIL to 2nd MAY, 1910.

(*a*) ENTOMOLOGY.

By R. Illidge.

The insect fauna of the district under notice during our two excursions to the locality, viz., September, 1909, and May-Day, 1910 was especially notable for its exceeding paucity. How to account for this is a question which only an extended acquaintance with the surrounding country could solve. The flora appears fairly rich, and many plants found there as the present time round Brisbane yield interesting forms of life. The mosquito, quite a pest in various localities still, was there almost absent, and the same might be said of flies, grass-hoppers, and the like. In fact, the general scarcity of all insects was indeed remarkable, and close searching revealed a meagre number, of which I append a list. Amongst them, however, are one or two deserving of special notice. The first, a member of a curious family of Coleoptera, the Brenthidæ, and probably of the genus *Amorphocephalus*, was found associated with some large ants—*Camponotus* sp. Of these a pair only was captured, the male being armed with mandibles, and having a gular horn, like some species of *Psalidura* in the Amycteridæ, a singular sub-family of weevils, and hence exhibiting some sort of relationship, bringing this group (*i.e.*, the Amycteridæ) with a boring rostrum, nearer to the Brenthids than has hitherto been suspected. The other coleoptera—*Carenum triste*—is more noteworthy for its rarity, as previous to this, I only knew of it from McLeay's description.

Coleoptera.

Carabidæ: *Pamborus viridis*; *Acrogenys hirsuta*; *Carenum triste*; *Epicosmus sp.* (?); *Notonomus viridimarginatus*. Histeridæ: *Hololepta sp.* (?). Pyrochroidæ: *Lemodes coccinea*. Tenebrionidæ: *Encara westwoodi*: *Adelium striatum*; *Cardiothorax sp.* (?). Cistelidæ: *Apatelus sp.* (?). Scarabæidæ: *Cryptodus subcostatus*. Curculionidæ: *Rhinaria signifera*; *Chrysolophus spectabilis*: *Psalidura montana*; *P. sublineata*. Brenthidæ: *Amorphocephalus sp.* (?). Chrysomelidæ: *Paropsis marmorea*.

Orthoptera (Blattidæ): *Polyzosteria, sp.* (*limbata* ?). Hymenoptera: Eumenidæ *Abispa splendida*. Chrysididæ: *Stilbum splendidum*. Thynnidæ: *Diamma bicolor*: *Thynnus, sp.* (?). Hemiptera: Pentatomidæ: *Pœcilometis, sp.*

LEPIDOPTERA.

Nymphalidæ: *Euploea corinna*; *Tirumala hamata*; *Acræa andromacha*—abundant on top of Ngun Ngun; *Hypolimnas bolina*—one male only; *Pyrameis kershawi*; *Junonia villida*; *Heteronympha merope*; *Hypocysta adiante*; *H. pseudirius*; *Ypthima arctous*. Lycænidæ: *Candalides absimilis**; *C. heathi**; *C. erinus**; *Ogyris olane*.

Pieridæ: *Delias nigrina*.

Hesperidæ: *Trapezites petalia**; *T. iacchus*.*

(*b*) BOTANY.

By Jos. Wedd and Cyril White.

LIST OF PLANTS COLLECTED IN ADDITION TO THOSE OBTAINED IN SEPTEMBER, 1909 (*vide Queens. Nat.* vol. I., No. 5, p. 119.)

Anonaceacæ: *Eupomatia laurina*. Violarieæ: *Ionidium suffruticosum* (the orange-flowered form). Sterculiaceæ: *Seringia platyphylla*. Rutaceæ: *Zieria obcordata*. Sapindaceæ: *Dodonæa triquetra*. Leguminosæ: *Daviesia ulicina*: *Crotalaria linifolia*; *Smithia sensitiva* (recorded from Glass House Mountains, but not collected by any of our members); *Indigofera australis*; *Desmodium rhytidophyllum*; *D. polycarpum*; *Acacia juniperina*; *A. aulacocarpa*; *A. Arundelliana*; *A. implexa*. Rosaceæ: *Rubus moluccanus*. Saxifrageæ: *Abrophyllum ornans*; *Callicoma serratifolia*. Droseraceæ: *Drosera spathulata*; *D. auriculata*; *D. binata*. Halorgaeæ: *Haloragis teucroides* (in leaf only, so doubtful). Myrtaceæ: *Eucalyptus hæmastoma*; *E. robusta*; *E. pilularis*; *E. trachyploia*, var. *fruticosus* (a variety of the White Bloodwood flowering, and fruiting in a shrubby state on the top of Mt. Ngun Ngun); *Syncarpia laurifolia*. Compositae: *Lagenophora Billiarderi*. Epacrideæ: *Epacris pulchella*; *E. microphylla*; *Monotoca scoparia*. Asclepiadeæ: *Hoya Keysii* (?) (a species of *Hoya* was obtained with a somewhat different growth and smaller leaves than *Hoya australis*. It is most likely referable to *H. Keysii*, Bail.) Scrophularineæ: *Gratiola pedunculata*. Lentibularieæ: *Utricularia cyanea*. Acanthaceæ: *Eranthemum variable*. Labiateæ: *Plectranthus parviflorus*. Laurineæ: *Cassytha filiformis*. Proteaceæ: *Banksia collina*; *Grevillea leiophylla* (obtained at Mt. Tibrogargan). Loranthaceæ: *Loranthus pendulus* (on *Eucalyptus* spp.) Euphorbiaceæ: *Phyllanthus minutiflorus*; *Breynia oblongi-*

*On summit of Ngun Ngun.

folia. Cycadaceæ: *Macrozamia spiralis*. Burmanniaceæ: *Burmannia disticha*. Orchideæ: *Dendrobium teretifolium*; *Pterostylis Whitei*; *Corysanthes bicalcarata*. Hæmodoraceæ: *Hæmodorum tenuifolium*. Scitamineæ: *Alpinia cærulea*. Liliaceæ: *Smilax glycyphylla*. Xylideæ: *Xyris gracilis*. Palmeæ: *Arcontophœnix Cunninghamii*; *Livistona australis*. Juncaceæ: *Xerotes confertifolia* (The undermined species referred to in "*Queensland Naturalist.*" vol. I., p. 120, which approaches in many respects to *X. longifolia*, R. Br., was sent to Kew, and the authorities there reported that it came nearest to a West Australian species, *X. collina*, R. Br. It has since been described by the Govt. Botanist under the name of *X. confertifolia* (Bailey, F M., "*Queens. Agric. Journal*," July, 1910). Eriocauleæ: *Eriocaulon australe*. Cyperaceæ: *Fimbristylis diphylla*: *Scleria sphacelata*; *Fuirena glomerata*. Gramineæ: *Panicum parviflorum*; *P. bicolor*; *P. marginatum*, var. *strictum*; ;*Arundinella nepalensis*; *Pollinia argentea* *Anthistiria ciliata* (a beautiful glaucous form was seen covering the hillsides); *Aristida ramosa*; *Sporobolus piliferus* (a South American grass, evidently naturalized, seen growing plentifully in the close vicinity of the railway line). Filices: *Blechnum serrulatum*; *Notholæna distans*: *Lindsæa microphylla*; *Polypodium irioides*; *Asplenium nidus*.

(*c*) POND LIFE.

By W. R. Colledge.

During the excursion to the Glass House Mountains, we did not find any good permanent pools. The creek and adjacent pockets were tested, and a few varieties of Rotifers were collected. Among these were *Metopidia solidus*, *M. oxysternum*, *M. acuminata*, *Salpina eustala*, *Cyrlonia tuba*, *Polyarthra platyptera*, and another not yet identified, but of the same species as one that was secured during the excursion to Goodna on 9th April, a specimen of which has been sent to London for determination. A quantity of Nitella was found in the bed of the creek, and very few Entomostraca were taken.

(*d*) *TERMITES* (WHITE ANTS), AND *MYRIAPODA-CHILOPODA*.

By H. Tryon.

Notwithstanding the district had evidently been from time to time the scene of extensive bush fires, it was found to be fairly rich in Formicidæ (Ants), and Termites (so-called "White Ants"), and on these attention was bestowed,

other insects being, for the time being, little in evidence. Postponing the consideration of the Ants proper met with, it may be stated, that the most common kind of Termite was a species of *Coptotermes*, allied to *C. lacteus*, F., but apparently differing from it, in having 15-jointed (instead of 16-jointed) antennæ, and a series of small teeth towards the base of one of its mandibles. There were also found (2) *Eutermes hastilis*, Frog., *Termes serratus*, Frog., and *Rhinotermes intermedius*, Brandt, the latter a remarkable "White Ant," inasmuch as the small communities comprise two different races of "soldiers"—one of a larger, and the other a smaller size. The first-mentioned termite harboured in its nests a curious flat-bodied insect, first brought under the recorder's notice by Dr. T. L. Bancroft, but since the event alluded to, not uncommonly seen.

The Chilopodous myriapods, or Centipedes, were individually numerous, as the sandy nature of the ground at the bases of the "Glass Houses" might suggest. In addition to our largest species, *Heterosoma rubripes*, Brandt, occured two species of *Cormocephalus*, viz., *C. Westwoodii*, Newport: and *aurantiipes*, Newman: an *Otostigma*, representing an apparently undescribed species, and a *Lithobius*, related to the Phillipine Island species—*L. semperi*, Haas.

BIRDS OF THE GLASS HOUSE MOUNTAINS' DISTRICT.

By W. Weatherill.

The following birds were noticed by the recorder on the occasion of the Club's excursion to the Glass House Mountains' District on 11th to 13th November, 1909: Their enumeration may be useful for future reference. Sittella leucocephala, *Gld.*; Climacteris leucophæa, *Lath.*; Monarcha melanopsis, *Vieill*; Malurus melanocephalus, *V. and H.*; Rhipidura albiscapa, *Gld.*; Philemon corniculatus, *Lath.*; Manorhina garrula, *Lath.*; Pardalotus punctatus, *Temm.*: P. melanocephalus, *Gld.*; Melithreptus albigularis, *Gld.*; Trichoglossus novæhollandiæ, *Gmel.*; Psitteuteles chlorolepidotus, *Kuhl.*; Dicæum hirundinaceum, *Shaw*; Gerygone albigularis, *Gld.*; Myzomela sanguinolenta, *Lath.*; M. obscura, *Gld.*; Pachycephala rufiventris, *Lath.*; Dacelo gigas, *Bodd.*: Dacelo leachi, *Vig. and Horsf.* (high up on Crook Neck Mountain); Ægintha temporalis, *Lath.*; Grallina picata, *Lath.*; Collyriocincla harmonica, *Lath.*; Zosterops cærulescens, *Lath.*; Glossopsittacus pusillus, *Shaw*; Halcyon Macleayi, *Jard. and Selby*; Corone australis, *Gld.*;

Graucalus melanops, *Lath.*; Ptilotis chrysops, *Lath.*; Myiagra rubecula, *Lath.*; Acanthiza chrysorrhoa, *Quoy. and Gaim.*; Burhinus grallarius, *Lath.*; Hirundo neoxena, *Gld.*; Geopelia placida, *Gld.*; Eudynamis cyanocephala, *Lath.*; Strepera graculina, *White.* *Note.*—No accipitrine bird is mentioned : only one, however, was observed in flight, and could not be identified.

NEW BOOKS.

Harmsworth's Natural History, edited by R. Lydekker, Sir H. Johnston and Prof. Ainsworth. Part I. of this beautifully illustrated, comprehensive, popular work, well adopted for nature study purposes. Received from the publishers. through their Brisbane agents (Messrs. Gordon and Gotch.

Baker (R.T., F.L.S.—Curator Technological Museum, Sydney). "Building and Ornamental Stones of New South Wales." 2nd Edition, Sydney, by Authority, 1909. Technical Education Series, No. 15. A valuable and interesting work. issued by the Department of Public Instruction, N.S.W. ; containing, in addition to descriptive letterpress, relating to no less than thirteen classes of building-stones ; thirty-six illustrations—by the three-colour process—of polished granites, trachytes, porphyry and marbles, as well as numerous other plates. Received from Mr. G. H. Barker, on behalf of its author.

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PROCEEDINGS.

EXCURSION, 9th JULY, 1910.

Petrie's Quarry.—Attendance, 14. Leaders: W. R. Colledge, L. C. Green, S. B. J. Skertchly and H. Tryon.

EVENING MEETING, 28th JULY, 1910.

Chairman: W. R. Colledge. Attendance, 15.

Reports: Pond Life of Petrie's Quarry, by W. R. Colledge; Geology of Petrie's Quarry, by S. B. J. Skertchly.

Exhibits: Butterflies and Moths, collected during a recent visit to England, by Dr. T. P. Lucas, who related many interesting incidents of his trip. By Cyril White, (1) An Alga (*Cladophora glomerata*) found growing on old rope at the Kangaroo Point Pontoon, Brisbane, and not previously recorded from Queensland waters; (2) Fungus (*Polyporus portentosus*) found growing on the trunk of a Eucalypt at One Tree Hill, Brisbane. This species, which attains a fair size, is, according to F. M. Bailey, the one that the aborigines of South Australia used for carrying fire; (3) Fruits of the Gooseberry Cucumber (*Cucumis myriocarpus*), a South African plant that within the last few years has established itself in Queensland. It has been suspected of causing the death of horses in the south-western portion of the State.

EXCURSION, 6th AUGUST, 1910.

Northgate Junction. Attendance, 8. Leaders: W. R. Colledge, H. Tryon and J. Wedd.

EVENING MEETING, 25th AUGUST, 1910.

Chairman: W. R. Colledge. Attendance, 15.

Congratulations: The Chairman alluded to the appointment of F. M. Bailey, F.L.S., Colonial Botanist, as President of Section D. (Biology) of the Australasian Association for the Advancement of Science, and it was decided to congratulate Mr. Bailey on the event.

Reports: Pond Life of Northgate Junction Excursion, by W. R. Colledge (*vide* Transactions, p. 162); Notes on the Bird Life of the same excursion, by G. H. Barker (*vide* Transactions, p. 162).

Exhibits: By S. B. J. Skertchly, Diamond in Matrix; by J. Lamb, Precious Opal from the vicinity of Brisbane; by E. H. Shearwin, Ichneumon Fly; by R. Illidge, Butterflies and Moths, with Notes (*vide* Transactions, p. 164); by the President, on behalf of J. D. Ogilby—a curious fish (*Centriscus scutatus*, Linn.) and Crabs, from the Barrier Reef; by Cyril White, Two Specimens of Carrion Fungi—Phalloidei (*Aserŏe rubra* and *A. poculiforma*), the latter a new species, so named by F. M. Bailey. It differed from all previous plants of this genus in its having no very distinctly marked stem, the goblet shape of the whole plant, and its upright—not spreading—lobes. Collected at Toowong by Miss Muriel I. Gregory.

EVENING MEETING, 22nd SEPTEMBER, 1910.

Chairman: W. R. Colledge. Attendance, 23.

Delegate: Prof. S. B. J. Skertchly was appointed the Club's representative at the next meeting of the Australasian Association for the Advancement of Science, to be held in Sydney.

Paper: "An Insect Importation under an Unusual Mode of Occurrence," by H. Tryon (*vide* Transactions, p. 165). "List of Birds seen at Enoggera," by G. H. Barker (*vide* Transactions, p. 167).

Exhibit: By R. Illidge, Fig Parrakeet, from vicinity of Brisbane; by W. R. Colledge—under the microscope—Arenaceous Foraminifera, dredged off the coast of Queensland.

Ornithologists' Union: H. Tryon, Organizing Secretary in connection with the Tenth (Brisbane) Session of the

Australasian Ornithologists' Union, reported the arrangements he had made for the reception, entertainment and business of the Union in Queensland. The arrangements met with the approval of the meeting.

Address: "On the Protection of Native Birds in Queensland," by H. Tryon, who gave a brief resumé of the Native Birds Protection Acts. A discussion ensued which resulted in the following resolutions being carried unanimously, viz. :—

(1) That the Native Birds Protection Acts should be more strictly enforced, especially in their relations to Reserves.

(2) That inquiries be made with a view to North Percy Island being declared a Reserve under the Native Birds Protection Acts for the preservation of the Megapode.

TRANSACTIONS

EXCURSION TO NORTHGATE JUNCTION, 6th AUGUST, 1910.

REPORT ON POND LIFE.

By W. R. Colledge.

The section of the Club devoted to Pond Life fished in Virginia Creek and the adjacent pools. A fine collection of *Volvox globator* was found in one detached pool, but none in the others. A specimen of the larva of *Paraponyx* was obtained which was at first thought to be one of the Caddis fly, as it had severed two pieces of the leaf of the water plant *Otelia ovalifolia*, cementing them together for a dwelling, but from the difference of the head and thorax from the Caddis larva, and the branchial appendages, it was identified as a *Paraponyx*. Various species of Rotifers were found, including *Mastigocerca elongata*, *M. birostris*, *Anurea aculeata*, *A. cochlearia*, *Synchœta stylata*, *S. ovalis*, *Copias cerberis*, *Metopidia solidus*, *M. triptera*, *Salpina eustala*, *Dinocharis tetractis*, *Euchlanis oropha*, and *Conochilus dossuaris*. These were all forms that had been previously found on other excursions. In addition, one that I had not formerly recognized was taken, viz., *Philodina citrina*. Quite a number of infusorial, black *Stentors* appeared. Among other specimens collected were—a very small variety of *Cyclops quadricornis*; *Diaptomus castor*; Diatoms of the genus *Synedra*; and a very fine alga of the species *Zygnema*, some of the filaments of which were in conjugation.

A FEW IMPRESSIONS OF THE BIRDS OF NORTHGATE, 1910.

By G. H. Barker.

Saturday, 6th August, was certainly a bird lover's day. The afternoon was warm and bright, and on every hand was evidence of the departure of our short-lived Winter. In the Bird world no time is being lost in the annual house-hunting; in fact, some of our friends have evidently made a very early start, as we came across the nest of the

Harmonious Thrush (Collyriocincla), containing three eggs ; the finished burrows of the Pardalote also being very plentiful.

Attracted by the noise made by a pair of these last-named birds, I walked over to the edge of a sand-spit where a little heap of shredded bark laying on the floor, was an eloquent lesson on the old moral of "building castles in the sand." This pair had evidently found that the sides of the pit provided an easy material to burrow in, but the sand carters had undermined the area with disastrous results to the Pardalotes.

The song of the Wild Canary (Gerygone) and the call of the Blood Bird (Myzomela) were perhaps the most pleasing features of the ramble, especially the note of the latter, which was only eclipsed in its persistency by the strident call of the Pardalotes. I was greatly pleased in discovering a family of 7 or 8 Blue Wrens (Malurus), as these birds are not plentiful about Brisbane, and when one has been accustomed to their cheery notes forever round one's garden, as they are in the South, such pleasure can be readily understood.

A fine soloist in these scrubs just now is the Harmonious Thrush (Collyriocincla). At this time of the year this bird fully justifies its first name, and when this artist is assisted by his lesser cousin the Thick Head (Pachycephalus), the resulting concert is worth a long journey to hear. Nor is the "Harry Lauder" side of the performance forgotten, for frequently the listener has his attention diverted from the thrushes by the sarcastic chuckle of a Kingfisher, as it flies up with a fat grub to a convenient outlook, or the ridiculous remarks of a Leather Head, preening its feathers in a near-by tree-top. An acrobatic turn in the entertainment is also provided, for every now and then there is a startled scream, and one looks in time to see a green flash as a pair of parrakeets go hurtling hither and thither in a headlong dash through the trees. Then a long sustained cadenza attracts one's notice to a side show where a little performer is going through some strange movements on the next tree : backwards and forwards, upwards and downwards, with an occasional vicious stab at the bark. This useful little bird, the Tree Creeper, is more often heard in the timber of the hills and gullies, but I suppose that many of these unwritten rules, at this season of the year, are broken through the sheer joy of living.

But evening draws on ; there is a train to catch ; so reluctantly I hie myself to the railway, leaving my feathered friends to prepare for the coming night. Thus ends the afternoon at Northgate, and one returns to the many duties of every-day life, conscious of having been

permitted an insight into a community, where the spirit of thankfulness and pure happiness, prompts an unceasing hymn of praise to the Giver of every good.

Appended is a list of the birds observed during the afternoon, numbering 25 different species.

List of Birds observed at Northgate Junction, August, 1910.

1. Corvus coronoides, Vig. & Hors. Crow.
2. Oriolus viridis, Lath. .. Oriole.
3. Grallina picata, Lath. .. .. Magpie Lark.
4. Collyriocincla harmonica, Lath.? Harmonious Thrush.
5. Graucalus melanops, Lath. .. Cuckoo Shrike.
6. Micrœca fascinans, Lath. .. Brown Flycatcher.
7. Gerygone albigularis, Gld. .. Native Canary.
8. Malurus ? cyanochlamys, Sharpe Silvery-blue Wren.
9. Rhipidura tricolor, Vieill .. Wagtail.
10. Rhipidura albiscapa, Gld. .. Fantail.
11. Cracticus destructor, Temm. .. Butcher Bird.
12. Pachycephalus gutturalis, Lath. Thickhead.
13. Myzomela sanguinolenta, Lath. Blood Bird.
14. Zosterops coerulescens, Lath... Silver Eye.
15. Philemon corniculatus, Lath. Leather Head.
16. Pardalotus melanocephalus, Gld. Diamond Bird.
17. Dacelo gigas, Bodd. .. .. Jackass.
18. Alcyone azurea, Lath. .. Blue Kingfisher.
19. Halcyon macleayi, J. & S. .. Macleay's Kingfisher.
20. Geopelia placida, Gld. .. Peaceful Dove.
21. Notophoyx novæ hollandiae, Lath. .. .. .. Blue Crane.
22. Carphibis spinicollis, Jameson Straw Necked Ibis.
23. Climacteris leucophaea, Temm. Tree Creeper.
24. Trichoglossus novae-hollandiae, Gmel. .. .. Blue Bellied Lorikeet.
25. Glossopsittacus pusillus, Shaw Little Lorikeet.

NOTES ACCOMPANYING EXHIBITS.

By R. Illidge.

TIMBER MOTHS FROM WESTERN AUSTRALIA.

(*Charagia nobilis* and *Charagia scripta.*)

Some years ago I had the honour of reading a paper before the Royal Society of Queensland, describing the natural history of our East Australian species of these beautiful moths. The genus appears to be confined to Australia, New Zealand and New Guinea and the islands adjacent thereto. In Australia we have many fine species, such as *Charagia* (*Œnetus*) *mirabilis, C. ramsayi, C. splendens*,

etc. *Leto staceyi* is the largest and most remarkable, some specimens extending over nine inches, and *Œ. mirabilis* the most magnificent, though closely pressed by *C. ramsayi* in this respect. As regards the genus *Leto* just mentioned, there is a species known as *Leto venus* found in Africa (fawn colour with silver spots), but I think from figures I have seen of it that it can be safely referred to some other genus. It is interesting, however, as being the only foreign hepialid moth known to me which in any way approaches the beauty of our insects. The small dull-coloured moth is the perfect insect of a predaceous larva that attacks the caterpillars and chrysalids of these grand insects in their chambers in the wood, and there destroys them. It is a pyralid related to the Galleria, so destructive amongst bees.

AFRICAN ORANGE TIP BUTTERFLIES.

Teracolus is a genus of Pierid butterflies largely confined to Africa, usually having the upper surface white or yellow, with a broad apical band varying from orange-red to the most brilliant carmine. In some species, however, the apical band is black, but having on the black ground spots of splendid iridescent amythystine hues. These latter species are by some considered to form the genus, which in such case would be entirely confined to the Ethiopian region, whereas those having the red or orange tips constitute the genus *Callosune*, which extends into India. These genera, if we consider *Callosune* as distinct from *Teracolus*, are closely related to the orange tips of the Palæarctic and Nearctic regions known under the genus *Euchloe* (*Anthocharis*). The butterflies now exhibited are all from Africa—Natal to British East Africa. Taveta, the place of capture of some specimens, is a military station lying under the shadow of Mt. Kilimandjaro.

AN INSECT IMPORTATION UNDER AN UNUSUAL MODE OF OCCURRENCE.

By Henry Tryon.

The insects under notice were received on 5th July from Mr. S. Russell, agent for a Brisbane firm of indent merchants, and were found under the following peculiar circumstances. In opening up a roll of French coating serge received from France for a Brisbane client of the firm alluded to, these examples of the family Hymenoptera were found in connection with certain tunnellings that penetrated the different layers of the cloth whilst still

unrolled. As the material was regarded as being damaged, a question arose as to whether the insects had occasioned this injury whilst it was in the indent merchant's hands, or had established relations with the cloth prior to its arrival here, or in other words, were denizens of Australia or not.

The reply submitted, whilst meeting this inquiry, explains the peculiar circumstances attending the discovery. It is understood both specimens were alive when discovered.

The insects in question are the male and female of a large Saw Fly—*Sirex gigas*, Linné, popularly spoken of as the Giant Saw Fly (Fr. Le sirex géant : Germ. Riesen-Holzwespen). The Giant Saw Fly is a native of Europe, and is not known to occur in Australia.

That the damage to the serge has actually been effected by it is shown by the fact that in the alimentary canal of one of the insects minute fragments of dyed wool occurred in enormous numbers.

The insect is naturally a borer of standing trees, coniferous ones (Pines) especially, living within their wood as a grub, and emerging from it by cutting its way out when adult, the latter operation being effected by powerful jaws or mandibles.

The unusual habit of damaging serge now brought under notice may be thus accounted for :—When the wood around which the textile was wound was first used, it harboured already within it the grubs or larvae of the Sirex that had previously attacked it—possibly when forming part of a living tree—by depositing eggs by means of a saw-like ovipositor within its substance. Under ordinary circumstances the fully developed or winged insects would gnaw their way out during the European summer (say June), after an interval of about a year had elapsed since the eggs were deposited. But should the wood meanwhile become dry, the issue of the saw flies might be deferred for a sufficient time to admit of their being transported therewith—in this case the wood forming the object around which the cloth was wound—to some over-sea destination. No culpability necessarily would attach to a party using the wood for the purposes alluded to, since the insects might occur within its substance with little or no indication of this being the case. In issuing from the wood, the scene of their grub-life, the saw flies would encounter no difficulty in biting through the layers of a roll of cloth, in fact, sheet-lead would not resist such action on their part.

It may be of interest to remark that as long ago as 1853, a French entomologist, Mons. M. H. Lucas, read a paper before the "Société Entomologique" of France (*Bulletin de Soc. Ent. Fr.* 1853, *p.* 53), on just such an

occurrence as Mr. S. Russell has brought under notice, the insects in this instance of their occurrence having entered the cloth from "un cylindre de bois de sapin sur lequel avait été enroulée une pièce de drap que confectionnait un tisserand. Lorsque le travail fut achevé et le drap déroulé, on constata que la pièce était percée sur cinq ou six épaisseurs qui correspondaient les unes aux autres, altération très dommageable pour l'ouvrier."—Lucas, *Op. cit.*

LIST OF BIRDS SEEN AT ENOGGERA ON SUNDAY (MORNING), SEPTEMBER 18th, 1910.

By G. H. Barker.

Grallina picata, Lath., and young ; Collyriocincla, sp.?; Graucalus melanops, Lath. ; Micrœca fascinans, Lath. ; Rhipidura tricolor, Vieill (Sauloprocta motacilloides, Vig. & Hor.) ; R. picata, Gld. ; Monarcha melanopsis, Vieill. ; Gymnorhina tibicen, Lath. ; Cracticus destructor, Temm.; Eopsaltria australis, Lath. ; Pachycephala gutturalis, Lath.; P. rufiventris, Lath., female only observed ; Climacteris leucophæa, Lath.; Myzomela sanguinolenta, Lath.; Zosterops sanguinolenta, Lath.; Melithreptus gularis, Gld.; Ptilotis lewini, Swain ; Manorhina garrula, Lath.; (Myzantha garrula); Philemon corniculatus, Lath. ; Pardalotus melanocephalus, Gld.,with young ; Hirundo neoxena, Gld.; Petrochelidon ariel, Glid., and nests ; Anthus australis, Vig. & Hors., nest and egg ; Eurystomus australis, Swain ; Cisticola exilis, Vig. & Hors. ; Alcyone azurea, Gld. ; Dacelo gigas, Bodd. ; Halcyon macleayi, J. & S. ; Cuculus pallidus, Lath. ; Glossopsittacus pusillus, Shaw ; Geopelia tranquilla, Gld. ; (G. placida, Gld.)

METEORIC STONES, WITH REFERENCE TO DISCOVERIES IN QUEENSLAND.

By Henry Tryon.

The unusually bright meteor that was observed in Southern Queensland on the evening of 20th April last, has been the occasion for the daily press directing attention to the probability of "Meteoric Stones" (that have fallen as part of this phenomenon) being met with, and it will not be without interest, therefore, to dwell upon their characteristic features before relating specific instances of their occurrence in this State,—also

These bodies named meteorites are of different character, but the many kinds in which they occur may

be assigned to well-defined groups, based on their composition.

The best known perhaps are the iron-meteorites. These are subdivided into (1) the siderites proper, composed in large part of metallic matter, and (2) the litho-siderites, in which the metallic portion forms a network that encloses stony matter (silicates), the latter being present, however, only in a subordinate degree.

Then there are (3) the stone-meteorites, in which the stony matrix far exceeds the metallic part—sometimes spoken of as aerolites, with their two subdivisions—(*a*) those in which the stony matrix is more or less of a uniform character, and (*b*) those in which there occur round or polyhedral masses from the size of a cherry downwards—composed of bronzite (enstatite), nickel iron, or chrysolite—named chondrites. The stony portion itself may be constituted of anorthite felspar, augites, olivine, etc.

Reverting to the iron-meteorites, we again find them capable of being grouped into different sections depending on the physical character of the iron itself.

Now the iron which is almost invariably found in meteorites, and which in the iron-meteorite may amount to 96 per cent. of its weight, is of a peculiar character, not observed—with one exception only—in any iron of terrestrial origin. Its special nature is dependent on its being combined with one or more other elements, amongst which nickel invariably is present. The nickel in fact may amount to from 2.8 to 28 per cent., the higher proportion, however, probably relating to the analysis of a portion of a meteorite that was not an average portion, and not expressive therefore of its general constituency.

Thus as the outcome of this varied association, we have (*a*) nickel-iron, the commonest mode of occurrence; (*b*) phosphorus, nickel and iron—*Rhabdit*; (*c*) the combination of (*a*) and (*b*), *i.e.*, *Tœnit*; (*d*) iron, nickel, cobalt and phosphorous, *i.e.*, *Schreibersit*; and (*e*), a combination of *Schreibersit*, with an additional group of the same constituents less phosphorous, the whole constituting *Cohenit*. In addition to the elements named, chrome, carbon and others may occur.

An apparent exception to the generalization that a metal of natural origin in which iron and nickel are associated is of meteoric origin, is afforded by the well-known instance furnished by masses of iron met with at Ovifak in Disco Island, Greenland, occurring on a sheet of tertiary basalt, or in dolerite masses contained in the same. This contains not only nickel, but in other respects reproduces the character of typical meteoric iron, especially so far as relates to its chemical composition.

Now the otherwise special character of the meteoric-iron component of the iron meteorites gives rise to the exhibition on their part of a peculiar structural conformation, or usually so, for there is a very small class of meteorites, named ataxites, in which the entire body, or the greater part of it, does not exhibit this pervading structure.

This structure is really the outcome of crystalization, or of a phenomenon akin to it, and displays itself in the metallic-iron and nickel-complexes assuming, under the circumstances conditioning the formation or transformation of the meteorites, coils, beams or bands, etc., intersecting one another in a regular manner, resulting in the skeleton-structure, or surface, exhibiting symmetrical planes. Now these conform to two figures, the octahedron and the hexahedron, that characterize a like number of iron-meteorites, and that therefore are distinguished by the names of Octahedrite and Hexahedrite-Siderites, and, reverting to the foregoing Ataxites, they are thus separated into three classes.

When the iron meteorites (whether octa or hexahedrite), or any portion of them, are cut through and polished, and especially when the surface is acted upon by hydrochloric acid the fact of this structure is shown by the presentment of a well-known figured pattern, known as *Widmanstattens figures*, in which we may distinguish also what are styled *Richenbach's lamellae* and *Neumann's Lines*.

Another feature which is inherent in the polished surface is an unliability to become tarnished.

Again, generally speaking, stony and iron meteorites alike exhibit surfaces of fracture and surface-fusion; the one due to friction in passing through the earth's atmosphere, the other evidently arising in many instances before they have been subjected to the resistance that this has afforded to their transit.

[The conditions experienced by meteorites in their movement through space, affecting their path, their rate of progress and their temperature were here alluded to.]

Now with regard to relative frequency in which the different kinds of meteorites occur, it may be stated that the Royal Naturhistorischen Hofmuseums of Vienna contained in 1902, according to Friedrich Berwerth, 1,850 specimens, representing 560 falls. Of these specimens 209 amounting to 2553·491 kilogrammes were iron meteorites, 23 amounting to 122·033 kg. were meso-siderites (iron and stone), and 328 amounting to 637·388 kg. meteorites of stone. (1 kilo=2½lbs. adv.)—*cf.*, Annalen des K.K. Naturhist Hofmus. XVIII., 1, p. 46, 1903.

Australia itself has not contributed to any very great extent to our knowledge of meteorites. So far as the

writer can learn, the first description of a specimen from this region is due to W. Flight. This meteorite was derived from Victoria, and the account of it is contained in a paper entitled, "The Siderites of Cranbourne, near Melbourne, Victoria."—*Philos. Trans. Roy. Soc. Lond.* 1882. Since then we have papers, principally from the pen of A. Liversidge, on meteorites from New South Wales, Tasmania and Queensland. New Zealand also has yielded one that has been examined and described.

The Queensland meteorites were derived from specimens from Thunda, near Windorah, Diamantina District, in 1886; from Mungindi, on the south-western border, in 1887; and from Roebourne, Hammersly Range, in 1894.

That from Thunda weighed 1cwt. or more, and portions of it have been examined by many investigators, including Liversidge, who was the first to write about it. Even now specimens derived from it are on the market. According to E. Cohen, already quoted, it contains 98·85 per cent. of nickel iron. He cites also the findings and accounts given of the iron by different investigators, who are in general agreement regarding its composition. *Vid.* Meteoreisen Studien, Part XI., Vienna, 1900.

All the meteorites hitherto described as found in Australia are iron meteorites, with the exception of the Delaquin one of which Prof. A. Liversidge has given an account, which is partly iron and partly of stone composition.

The writer will now allude to two specimens that he has seen and handled that are not iron meteorites. As, however, the overtures for the loan of the specimens in 1896 did not result in their being forwarded to Brisbane for description, he can only produce the briefest notes (made in May, 1896), concerning them that were made on a hurried examination, when the opportunity for a more extended investigation appeared to be a matter of certainty.

These meteorites fell at Rockhampton, Queensland, in the spring of 1895, or nearly twelve months prior to 30th April, 1896, when they were inspected.

No. 1.—This meteoric stone was seen by Mr. J. Howe, of North Street, to come during a bright afternoon from a south-westerly direction, between 4 and 5 p.m., and to fall in Candle Street. It buried itself in the ground on striking the earth and was picked up.

The stone, on being found, was in four pieces, and had been shared by two witnesses to the occurrence. On these pieces being fitted together, the object weighed 2lbs., but missing fragments would amount to quite 1lb. more.

It was sub-pyramidal, slightly rounded and narrowed at one end, and concavely flattened at the other, having anterior and posterior irregularly-convex faces meeting

at the sides, its greatest height and breadth being subequal. Externally, it was of a dark pitch colour, and had a dull, smooth surface. Irregular raised lines traversed its face obliquely. All its angles and edges were rounded off. The dark colouration of the exterior was due to a superficial layer of matter, within which the meteorite was light gray. It was cveidntly composed of some granular, felspathic substance (? anorthite) that fractured irregularly, the surface being rough to the touch. No distinct crystals were apparent to macroscopical examination, but there were scattered through the main substance—sparingly—little particles of what appeared to be pyrites (probably bronzite) and ferrite, but were possibly representatives of distinct minerals. The surface yielded to the knife that readily scratched it. No measurements recorded.

No. 2.—This was seen by the writer at Mr. J. S. Edgar's house at the Botanical Gardens.

Here had been remarked what appeared to be a falling star close at hand, considerable electrical disturbance occurring about the same time. The stone, Mr. Edgar added, must have dropped during the middle of the afternoon.

This meteorite was of irregular rhomboidal form, with the sides almost plane. These met in almost straight lines, the angular edges being smoothed down. When resting on one of its faces, it was three inches deep at one end. The surface was smoothed, and the dull pitch black external layer was about $\frac{1}{32}$ inch thick. It was intact with one edge shattered (so as to disclose the nature of the substance composing it) when examined. Internally, it corresponded to No. 1 : some of the metallic particles near the surface were, however, decomposed and formed rust-like stains.

No. 3.—At the School of Arts, was a stone similar to that in Mr. Edgar's possession.

This, as was stated in 1896, was picked up about 200 yards from the Gaol by one of the men's wives resident there, and she had it in her possession a few days after its fall.

In striking the earth it made quite a cloud of dust in the air, and apparently came in contact with some hard substance, and so broke in pieces. One surface was slightly malleated, otherwise it resembled in composition Nos. 1 and 2.

[The writer, in conclusion, remarked on the possible connection between Comets and Meteorites, alluding to Professor A. Y. Bonilla's memoir on the history of Biela's Comet, the Falling Stars of 27th November, 1885, and the Meteorite that fell at Mazapil, Zacatecas, Mexico, on the same date, *c.f.* Annalen K.K. Naturalist. Hofmus., X. 308-327, Vienna, 1895.]

DONATIONS TO THE LIBRARY.

The following donations to the Library have been received since the last issue:—From Field Naturalists' Club of Victoria—*The Victorian Naturalist*, for August, September and October. From New South Wales Naturalists' Club—*The Australian Naturalist*, for July. From Geelong Field Naturalists' Club—*The Geelong Naturalist*, for September. From Royal Society of Queensland—Set of Proceedings (one volume incomplete). From British Museum—Handbook for Collectors, and fourteen volumes of Guide Books. From C. W. Holland—Introduction to Conchology, by J. W. Johnston; Geography of Mammals, by W. L. and P. L. Sclater; Report of Twelfth Meeting of Australasian Association for the Advancement of Science. From the Editor—*Knowledge*, for September. From Queensland Geological Survey—Report on Coal Measures of South-East Moreton, by E. O. Marks. From Amateur Fishermen's Association—Annual Report for 1909-1910.

ORNITHOPTERA.

Richmondia, Cassandra, Pronomus, Hecuba, Papilio, Foësa, etc., are always wanted in quantities and very best quality, in papers, by Emil Werner, Rixdorf, Berlin, Weserstr., 208, Germany.

ANTARTIC ROTIFERA.

The Journal of the Royal Microscopical Society for August, Part 4, p. 461, in referring to the Report of the British Antartic Expedition, 1907-9 (1910, pp. 41-65), states:—"Amongst the results of Sir E. H. Shackleton's recent Antarctic expedition, not the least interesting is the discovery of an extensive micro-fauna, mostly Rotifera and Tardigrada, living in the pools and small lakes which exist on Ross Island during the short summer season, but which are frozen solid for about ten months in the year. James Murray records sixteen species of Rotifera collected by himself at Cape Royds, of which the following five species, all Bdelloids, are described as new: *Philodina, gregaria, P. antarctica, P. alata, Callidina angularis, Adenita grandis*. The author enlarges on the severe conditions under which these Rotifera manage to exist, and it appears that their lives are actually prolonged by being frozen solid for ten months or more, in order to resume an active and merry life during the short succeeding summer. 'They do not ask for much in the way of luxury,' the author ob-

serves; 'give them a week or two of warm weather, say, + 40° F., and they are content to be frozen up for years.' It is not a little surprising to find in these regions *Floscularia cornuta* and *Hydatina senta*, and it may be legitimate to inquire whether Captain Scott's previous expedition had anything to do with the introduction of these species."

PROTECTION OF NATIVE FAUNA AND FLORA.

In view of the rapid destruction of many of our native animals and plants, the following extract from *The Journal of Botany* (Sept., 1910) may be of interest:—

"We learn from the *Selborne Magazine* that a reservation for alpine fauna and flora is being made in Switzerland. A small band of naturalists and botanists have devoted themselves to this work of preservation and have succeeded in setting aside as a National Park the wild and beautiful valley of Cluoza in the Engadine. This valley, situated at the foot of the lofty Piz Quartervals and surrounded by natural walls of rock, will have nothing to fear henceforth from civilization in the shape of railways, monster hotels and factories. Here, too, the extermination of wild flowers will be strictly prohibited, and the chamois and even perhaps the bear will roam unmolested."

PHOTOGRAPHING THE FLIGHT OF INSECTS.

The August number of *Knowledge* contains some excellent articles, among which may be mentioned one by Dr. Alfred Gradenwitz on Photographing the Flight of Insects. The writer describes an ingenious method developed by a Parisian scientist, M. Lucien Bull, which increases the speed of the cinematograph to almost incredible figures. "Whereas the ordinary apparatus takes from thirty to fifty instantaneous pictures during a second, this high-speed cinematograph, in fact, enables as many as two thousand views to be taken during this short interval. It is thus possible to decompose the most fugitive phenomena, such as the motion of insect wings, as far as can be desired, and by projecting the component pictures on a screen in more or less rapid succession, to study their very mechanism. It may be said that by investigating the flight of insects, it is hoped to arrive at a true understanding of many problems met with in aviation."

THE

Queensland Naturalist.

THE ORGAN OF THE FIELD NATURALISTS' CLUB
AND ITS BRANCHES

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PROCEEDINGS.

EXCURSION, 8th OCTOBER, 1910.

Newmarket.—Attendance, 15. Leader, J. Wedd.

EVENING MEETING, 27th OCTOBER, 1910.

Chairman: W. R. Colledge. Attendance, 14.

Vote of Thanks: A hearty vote of thanks was passed to H. Tryon for the excellent work performed by him as Organising Secretary in connection with the visit of the Royal Australasian Ornithologists' Union to Brisbane.

Reports: Excursion to Newmarket—(*a*) Botany, by J. Wedd (*vide* Transactions, p. 177); (*b*) Pond Life, by W. R. Colledge (*vide* Transactions, p. 181); (*c*) Entomology, by H. Tryon; (*d*) Geology, by S. B. J. Skertchly.

Exhibits: By J. Wedd—Plants from Newmarket, accompanying report. By H. Tryon—Insects from Newmarket, accompanying report. By H. Tryon—Fungus Parasites from Newmarket, with observations thereon (*vide* Transactions, p. 181). By C. White—Plants from route of the proposed Transcontinental Railway. By E. H. Shearwin, under the microscope—Living Rotifer (*Melicerta ringens*). By W. R. Colledge, under the microscope—Butterflies' eggs.

EXCURSION, 5th NOVEMBER, 1910.

Ferney Flat:—Attendance, 11. Leaders: W. R. Colledge, H. Tryon, and J. Wedd.

EVENING MEETING, 24th NOVEMBER, 1910.

Chairman: W. R. Colledge. Attedndance, 15.

Election: Mrs. Pattinson and Ralph L. Higgins.

Reports: Excursion to Ferney Flat—(*a*) Botany, by C. White; (*b*) Entomology, by H. Tryon; (*c*) Pond Life, by W. R. Colledge.

Paper: "The Name Glass Houses," by David Owen, M.A. (*vide* Transactions, p. 184).

Exhibits: By C. White—Plants from Ferney Flat accompanying report. By H. Tryon—Insects from Ferney Flat, accompanying report. By W. R. Colledge—Drawings of Rotifers taken at Ferney Flat. By J. Wedd—Plants from New Zealand. By W. Weatherill—Lily Walker—Jakana—and egg (*Hydralector gallinaceus*). By R. Hülsen—Larva of case moth. By Mrs. T. Pattinson—"Christmas" Beetle (*Anoplognathus Olivieri*—Scarabæidæ), of which H. Tryon described the habits, etc. By H. Tryon—A New Book, "A Research on the Pines of Australia" (by R. T. Baker and H. G. Smith), *vide* Transactions, p. 191). By W. R. Colledge, under the microscope—Living Rotifers (*Notops clavulata*).

EVENING MEETING, 15th DECEMBER, 1910.

Chairman: W. R. Colledge. Attendance, 11.

Paper: "Field Notes on Birds observed about midway between Terror's Creek and Mt. Mee," by W. Weatherill; read by Mr. Tryon for the author (*vide* Transactions, p. 186. In the discussion which ensued, R. Illidge remarked of *Orthonyx* that the female is much larger and more brilliant than the male, and builds a dome-shaped nest in steep, mossy banks of the moss itself, the nest being therefore difficult to detect.

Paper: "Strange Idiosynerasies of a Corella—*Licmetis nasica*" (*vide* Transactions, p. 189).

Address: On British Moths, by Dr. T. P. Lucas.

Exhibits: By Dr. T. P. Lucas—Moths of various families collected in England, in illustration of his address. By R. Illidge—Brilliant Beetles (*Buprestidæ*) from Java, Borneo and Madagascar. By E. H. Shearwin—A rare plant bug (not then identified). By Mrs. T. Pattinson—Beetle (*Xylotrupes australis*— Dynastidæ.) By W. R. Colledge—Beetle from Tambourine Mountain, identified as *Piesarthrius marginellus*.

TRANSACTIONS

EXCURSION TO NEWMARKET, 8th OCTOBER, 1910.

REPORT ON BOTANY.

By Jos. Wedd.

Locality: North side of Enoggera Creek, extending from the Kelvin Grove tram terminus to the Grove Estate. Length: about one mile. Width: about ¼ to ½ mile.

One hundred and sixty-six different species of plants are recorded in my list as growing on this small area, and the list could easily be extended to at least 180, as a few of the commonest weeds are not included, also the grasses and some of the water plants, together with a few plants, the identification of which was rendered difficult by the absence of flowers and fruit. Moreover, this small area included a Chinese vegetable garden of 25 acres. The occurrence of so many different species indicates the richness of this collecting ground, and taken in conjunction with its easy accessibility, should make it a favouraite resort for botanists.

In the early days this locality was called the "Three Mile Scrub" and was the "happy hunting ground" of nature lovers of a past generation, but its glory has, to some extent, departed. Dray loads of bird's nest and staghorn ferns and orchids were ruthlessly torn away from congenial surroundings, and taken to town to decorate ball rooms or triumphal arches or to maintain a lingering existence in bush houses, and now no trace of them is to be found. On a tall figtree—the only one left—some masses of *Dendrobium monophyllum* were seen, the only epiphyte noticed.

Of many of the scrub plants mentioned in the list, only one or two specimens of each kind are left. The rapid growth of saplings of various species of Eucalyptus and of lantana in the place of the dethroned monarchs of the forest has given the smaller scrub plants growing there the protection required and has thus helped to preserve for a time the scrub flora by giving it an environment approximating that which it previously enjoyed. The depredations of the wood-getters, however, will soon alter this, and it will not be long before the scrub plants will totally disappear.

In strong contrast with the majority of scrub plants, of which as before mentioned only one or two individuals of each kind were seen, were the two plants, *Alyxia ruscifolia* and *Alchornea ilicifolia*. These were found growing in great abundance. *Alyxia ruscifolia* belongs to the order Apocynaceæ, and is a handsome shrub, attracting attention at once by the peculiar arrangement of the leaves. These are sti[illegible], ovate, pungent, pointed and arranged in whorls of 4 or 5.

Alchornea ilicifolia, as its name implies, has leaves resembling those of the English Holly. Bentham states that this plant is famous for its parthenogenetic properties, having reproduced itself from seed in European gardens through several generations from female plants alone without the intervention of any male flowers. As the plant is, however, sometimes monœcious, it has been suggested by H. Tryon that, in the case referred to, the male flowers being inconspicuous escaped detection. It has also also been observed that the seeds have occasionally two embryos united at the base.

A prickly climping plant with beautiful sweet scented flowers was noticed. This was *Capparis sarmentosa*. The fruit is of a purple colour when ripe and is edible. At Killarney it rejoices in the euphonious appellation of "Mulpup," and is much sought after by the children. Another species, *C. lasiantha*, I found growing at St. George. The fruit there is called "nipang." I have seen it handed round for dessert at a house at which I dined.

Seven of the leguminous plants in the list were not seen on the occasion of our recent visit, but were collected and recorded in February last. They are annuals, and sprang up after the heavy rains of the previous months.

One solitary quandong tree was seen, *Elæocarpus grandis*, one of the largest trees in scrubs, with a blue fruit and a pitted stone.

Solanum auriculatum, an introduced tree from tropical America, grew in great abundance along the bank of the creek. It has purple flowers, yellow berries, and large, densely woolly leaves, with a pair of small semi-circular leaves at the base of most of the large leaves. It derives its name *auriculatum* from these ear-shaped leaves.

On the rising ground back from the creek a few *Macrozamias* were found, probably the species *spiralis*. The cones are from 6 to 8 inches long and about 3½ inches in diameter, somewhat resembling a pineapple. This plant is credited with producing rickets in cattle.

Duboisia myoporoides—the "eye-opening tree"—was found growing plentifully. Further reference to it will not be made now, as it was dealt with when reporting the results of a previous trip.*

Altogether a pleasant and, I hope, profitable afternoon was spent, although it is with feelings of sadness we contemplate the passing away of the indigenous flora to make room for the useful but unæsthetic cabbage.

List of Plants Growing at the Three Mile Scrub, Newmarket.

Ranunculaceæ: Ranunculus parviflorus. *Dilleniaceæ*: Hibbertia stricta. *Anonaceæ*: Eupomatia laurina. *Menispermaceæ*: Stephania hernandiæfolia. *Nymphæaceæ*: Nymphea flava. *Capparideæ*: Capparis sarmentosa. *Pittosporeæ*: Pittosporum revolutum; Citriobatus multiflorus; Bursaria spinosa. *Malvaceæ*: Hibiscus diversifolius; Abutilon oxycarpum. *Sterculiaceæ*: Seringia platyphylla; Rulingia pannosa; Commersonia echinata. *Tiliaceæ*: Grewia latifolia; Corchorus cunninghamii; Elæocarpus grandis. *Rutaceæ*: Zieria granulata; Medicosma cunninghamii; Acronychia lævis. *Meliaceæ*: Flindersia schottiana; Melia composita; *Celastrineæ*: Celastrus australis; Denhamia pittosporoides. *Rhamneæ*: Alphitonia excelsa. *Ampelideæ*: Vitis antarctica; V. opaca; V. clematidea. *Sapindaceæ*: Cupania pseudorhus; C. anacardioides, var. parvifolia; Ratonia pyriformis; Dodonaæ cuneata; D. triquetra. *Leguminosæ*: Daviesia squarrosa; Pultenæa ternata; Hovea acutifolia; Indigofera australis; Tephrosia purpurea; Crotolaria linifolia; Glycine clandestina; Zornia diphylla; Desmodium rhytidophyllum; D. varians; Lespedeza cuneata; Hardenbergia monophylla; Kennedya rubicunda; Castanospermum australe; Cassia mimosoides; Acacia penninervis; A. linifolia; A. complanata; A. cunninghamii; A. decurrens. *Saxifrageæ*: Aphanopetalum resinosum; Weinmannia lachnocarpa; *Myrtaceæ*: Leptospermum scoparium; Callistemon salignus; C. lanceolatus; Eucalyptus microcorys; E. corymbosa; E. maculata; Tristania conferta; T. suaveolens; Syncarpia leptopetala; Backhousia myrtifolia; Rhodamnia trinervia; Eugenia ventenatii; Decaspermum paniculata. *Onagrarieæ*: Jussiæa repens. *Passifloreæ*: Passiflora suberosa. *Umbelliferæ*: Trachymene incisa; Eryngium expansum. *Araliaceæ*: Astrotricha floccosa; *Rubiaceæ*: Pavetta indica; Morinda jasminoides; Pomax umbellata; Knoxia corymbosa. *Compositæ*: Vernonia cinerea; Pterocaulon cylindrostachys; Ageratum conyzoides;

* *Vide Queensland Naturalist*, vol. 1, p. 04.

Calotis lappulacea; C. cuneifolia; Olearia stellulata; O. nernstii; Glossogyne tenuifolia; Blumea lacera; Baccharis halimifolia; Helichrysum diosmifolium; Eclipta alba; Epaltes australis. *Goodenovieæ*: Goodenia hederacea. *Epacrideæ*: Leucopogon juniperinus. *Myrsineæ*: Myrsine variabilis. *Ebenaceæ*: Mabageminata. *Styracaceæ*: Symplocos spicata. *Apocynaceæ*: Carissa ovata; Alyxia ruscifolia; Tabernæmontana orientalis; Lyonsia reticulata; *Asclepiadeæ*: Secamone elliptica. *Gentianeæ*: Erythraea australis. *Solanaceæ*: Solanum auriculatum; S. stelligerum; Duboisia myoporoides. *Borragineæ*: Heliotropium anchusæfolium. *Scrophularineæ*: Veronica plebeia. *Bignoniaceæ*: Tecoma australis, var. meonantha. *Myoporineæ*: Myoporum acuminatum. *Verbenaceæ*: Clerodendron tomentosum; C. floribundum. *Labiatæ*: Salvia plebeia; Ajuga australis. *Chenopodiaceæ*: Rhagodia hastata. *Polygonaceæ*: Polygonum orientale; P. hydropiper; Muhlenbeckia gracillima. *Proteaceæ*: Grevillea robusta; Persoonia mitchellii. *Thymeleaceæ*: Pimelea altior; Wikstrœmia indica. *Santalaceæ*: Exocarpus latifolia. *Euphorbiaceæ*: Poranthera microphylla; Croton insularis; Glochidion ferdinandi; Phyllanthus thesioides; P. albiflorus; P. minutiflorus; Alchornea ilicifolia; Acalypha nemorum, Omolanthus stillingiæfolius; Mallotus philippinensis; M. claoxyloides; Breynia oblongifolia. *Urticaceæ*: Trema aspera; Ficus scabra; Aphananthe philippinensis. *Casuarineæ*: Casuarina glauca. *Cycadaceæ*: Macrozamia spiralis. *Hydrochorideæ*: Ottelia ovalifolia. *Orchideæ*: Dipodium punctatum; Caladenia carnea, var. alba; Dendrobium monophyllum; Pterostylis ophioglossa. *Amaryllideæ*: Eurycles cunninghamii. *Dioscorideæ*: Dioscorea transversa. *Liliaceæ*: Smilax australis; Eustrephus angustifolia; Dianella laevis; Cordyline terminalis; Rhipogonum album. *Commelinaceæ*: Commelina cyanea; Aneilema biflorum; A. gramineum. *Flagellariaceæ*: Flagellaria indica. *Juncaceæ*: Xerotes longifolia. *Typhaceæ*: Typha augustifolia. *Aroideæ*: Gymnostachys anceps. *Cyperaceæ*: Gahnia aspera; Cyperus exaltatus. *Filices*: Pteris falcata, var. paradoxa; Cheilanthes tenuifolia; Doodia aspera; Hypolepis tenuifolia; Adiantum æthiopicum; A. hispidulum; Davallia dubia.

REPORT ON POND LIFE.

By W. R. Colledge.

The Creek at Newmarket yielded comparatively few Rotifers. The curiously sculptured form of *Dinocharis tetractis*, with its long diverging toes, was seen. Others were : *Mastigocerca carinata*, with its long rat-like tail and glassy dorsal shield ; *Monostyla bulla*, with its single style and ovate body ; *Synchæta ovalis* and its larger relative, *S. stylata*, careering through the water with its kite-like figure and the swiftness of a motor car ; and little delicate-looking *Metopidia acuminatis*. digging into the vegetable debris with their frontal pickaxes. The ever present Aculias, and *Polyarthra platypteras*, armed with their twelve serrated swords, were the only other kinds observed. Larvæ of the May Fly were present. Caddis larvæ, having cut hollow grass stems into suitable lengths and camped in these moveable huts, were surprised at the change from the stones of the stream to the environment of a bottle. Among the Entomostraca were noted : *Diaptomas castor*, stretching its twenty-six jointed antennæ at right angles to the body ; *Macrothrix triserialis*, distinguished by its delicate setæ ; and *Cyclops quadricornis* of both sexes, the gentler one fulfilling her maternal duties by carrying a couple of egg sacs slung over the terminal segments of the body. Very few mosquitoes were found. One larva, with an extraordinary long anal spiracle and eyes, the separate facets of which were much more highly developed than in most species of *Culex larvæ*, and one pupa were captured : these belonged to *Culex annulirostris*.

NOTES ON FUNGUS PARASITES FROM NEWMARKET.

By Henry Tryon.

The very interesting flora of the Three Mile Scrub area, elucidated during the visit of the Field Naturalists' Club to Newmarket, and, as described in J. Wedd's paper, was found to include—in addition to the higher plants enumerated therein—most noteworthy exponents also of the more lowly organised groups, *e.g.*, the Fungi ; but it suffices at present to refer to the five kinds of this class that are exhibited, insomuch as they illustrate as many forms of relationship between parasite and host in plant life :—

1. Powdery Mildew of Acacia (Erysiphaceæ). Here we have the foliage of *A. aulacocarpa*—especially the younger

leaves—covered with a very fine, flour-like, grayish-white investment, having a slight glistening appearance. By aid of the lense we notice innumerable erect bodies springing from a close network of delicate filaments (mycelium). These bodies are formed of septate hyphæ, terminating in oval spores (*conidia*) that are being continuously formed and shed by abscission. This parasite, that is, in what is named its conidia-form conditions, seems to be entirely separable from its support and capable of being removed by simple abrasion. However, the mycelial threads have little suckers along their length, and these entering the epidermis of the leaf extract nutriment from the cells immediately under it. This form of parasitism then is a very simple one.

2. Rust of Acacia (*Uromyces phyllodiorum—Uredineæ*). Here we have, also on the leaves of Acacia aulacocarpa, small. rust-brown, raised, little pustules (*sori*), scattered in ill-defined patches over the surface, that when examined by the lens are found to consist of masses of a powdery substance, that have welled out from beneath the surface, raising and fissuring the epidermis in so doing. This substance is composed of the reproductive organs (spores) of the Uromyces fungus, the vegetative portion of which does not occur externally, as in the last instance of fungus parasitism, but dwells internally within the leaf tissue without modifying it to any extent, although eventually with the rupture of the epidermis, the subjacent cell-structures change their colour and die, a reddish discolouration surrounding each sorus as evidence of this.

3. Leaf Brand of Acacia (*Diplodia lichenopsis—Sphæropsidiaceæ*). This parasite occurs on the leaves of Acacia complanata, producing symptoms as follows :—Conspicuous small patches of dead tissue, reddish-brown, with raised margins, and that are often confluent, are distributed over the surfaces. Here the fungus grows internally in the leaf or is endogenous and soon kills the tissue where it occurs ; the reproductive organs—septate elliptical spores—also forming beneath the surface within small spherical receptacles (*perithecia*) deeply immersed at first—although ultimately apparent as small black points, and only tardily liberating their contents.

4. Leaf Pustule of Eucalyptus (*Phyllachora* (? *maculata, Cke.*)—*Pyrenomyceteæ*). This parasite was yielded by the large leaves of a young plant of Eucalyptus acmenoides, and was brought under our notice by E. Jarvis. Here we have on the living green leaf, large, low, purplish brown, swollen or raised bodies, measuring ¼ to 1 inch or more across, whose surfaces are densely shagreened with closely-set, rounded pustules, the older of which have dark centres. Here we have the fungus growing again internally, but

producing profound changes in the leaf-tissue, the loose elongate cells of the mesophyll dividing transversely and having produced—through stimulation due to the presence of the parasite—an abundance of special tissue to form the basis of the large weal-like bodies referred to. In this case, moreover, the parasitic organism itself occupies cavities in the new tissue, each lined with a special substance of fungus origin (stroma), and containing transparent-walled sacks (asci), each holding about eight oval, pinkish-brown, continuous spores. These cavities (or perithecia) corresponding in position to the pustules on the leaf-swellings, gradually develop thick black walls and burst through the surface, apparently however not liberating the spores that they contain until the decay of the leaf, in connection with which they occur. This is an instance of parasitism where marked alteration of the host's tissue results from its occurrence.

5. Gall-producing Fungus of Acacia (*Uromycladium Tepperianum—Uredineæ*). Cunningham's Acacia (*A. cunninghamii*) is the plant-host in this instance, and it may be remarked that, notwithstanding the organism falls within the same group as the Leaf Rust Fungus of Acacia already mentioned, and in fact was originally described by Saccardo under the generic name *Uromyces*, the effects produced on their victims by the two parasites are strongly dissimilar. Here we have an immense, chocolate-brown, irregularly contorted or distorted mass composed of new tissue (*Hyperplasy*), measuring 3 to 4 inches across, forming a most conspicuous object on the branch that supports it, instead of the speck-like pustules on the green phyllodes, as with *Uromyces phyllodiorum* attack. In fact the *Uromycladium* gall is formed by the perennial spawn threads (*mycelium*) of the parasite continually irritating the growing cells and effecting their multiplication, whilst the powdery, rusty, brown exterior marks the continuous formation in a thin but compact layer of reproductive organs (*teleuto spores*), large, beautifully fluted and striated spores, in clusters of three each on solitary stalks. This parasite has moreover some economic importance, since the diversion of the nutrient fluids into the galls often kills the branches of the tree or bush on which they occur. Moreover, it does not confine its attacks to one Acacia species.*

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* Note.—For a full account of the genus Uromycladium, reference should be made to D. McAlpine's "A New Genus of Uredineæ Uromycladium," *Annales Mycologici*, III., &c., 1905, 322—323, pl. vi—ix.

THE NAME "GLASS HOUSES."

By David Owen, M.A.

Mr. John Shirley, in his address on the Geology of the Glass House Mountains, before the Royal Society of Queensland in 1907, offered the suggestion that those remarkable hills had been so named by Captain Cook from their "apparent resemblance to glass palaces that he had seen in England." The suggestion was one that set me thinking, for during that very period I was studying a cluster of place-names, of which Glass House was of the number, with a view to discovering their meaning. The explanation that rewarded my study then is one that differs from Mr. Shirley's,—but I can understand that while it was with the geology of the hills he was mainly concerned, he had meant that he should be taken as speaking only casually when offering an opinion as to their meaning. I have examined those place-names often since, and with the same result, so that I venture now to submit it for the consideration of other students.

While all the world knows that Yorkshire was Captain Cook's native county, not many know that his birthplace is named Marton, and that it is situated on the northern edge of the Cleveland Moors. These facts are for the purpose now in hand, specially to be noted, as it is with reference to them that Cook must have given to those two objects in the geography of our part of the world, that are so familiar to us, their present names Glass Houses and Moreton Bay.

Now, the Cleveland Moors, like many other out-of-the-way places in Britain which have been left in their almost primeval state, still exhibit the ruined remains of the ancient population that long ago inhabited them; the most conspicuous of such remains being the more or less elevated tumuli and barrows that the old folk had used for burial purposes and for habitation. A century and a half ago, they could still show the outlines of their early form, and they stood almost undiminshed as to their original height. From the front seat of the old stage-coach, as it rounded the shoulder of a hill or clattered along the level moorland road, the traveller saw scores of these hillocks on either hand in groups of three or more, standing moveless and silent in the middle distance or glimmering faintly on the far horizon.

The name given to them by the people of the locality is *houes* or *howes*. Of these names the singular *houe* is a softened form of the Danish word *haug*, which means a burial-mound; a few of them may be enumerated, such as Blakhowe, Glashoue, Brownhowe, Threehoues, and

Leafhoue. The fact of the larger of them having served as dwellings has led to confusion being made between the plural name *houes*, which is descriptive of them as burying-places, with the English word *house*, which is descriptive of a dwelling-place.

Should this word *houes* afford a suffieiently reasonable explanation of the second element in Glass House, there will then be some warrant for expecting that some such word as *cladh*, a word of Celtie origin, and meaning a mound or tumulus, will suffieiently explain the second element Glass; so that, finally, the name Glass House may be regarded as a euphonised form of *cladh-haug*, a kind of Celtic-Norse eompound, meaning a burial-mound.

This seems a better view to take of the name than the one in which it has been made to appear as meaning "glass palaces," or, aecording to some, "glass furnaces." Crystal palaees had not come into use in Cook's time, and though he may have in some industrial quarter of a seaport town set eye upon furnaces for making glass, yet it is not likely that, whilst the upstanding hillocks of his native moors familiar to him from boyhood had never left his memory, he would be thinking of some pent-up furnaces seen by him in some smoky town, when searching his memory for a name for the wonderful hills that met his gaze as he was entering Moreton Bay.

The mere mention of the name of Cook's birth-plaee, Marton, should make anyone instantly to see the utter impossibility of there being any other name from which more appropriately to derive the name Moreton Bay. There is a point specially to be noted in this connection, and that is, that in the chart and in the text of the "Voyages," differences occur in the spelling of the proper names. On the chart which accompanies Vol. III., edition 1773, the entries are: "Glass Houses"—three of them,—and "Glass House Bay"; "Cape Morton" and "Morton Bay," whilst the last name appears in p. 514 of the text as "Moreton's Bay." These differences in the spelling may have occurred through the differenees of opinion that existed then and exist now as to the quality of the vowel *a* in the name Marton.

An examination on similar lines of the name of Cleveland in Moreton Bay might lead to the discovery of some point of connection between it also and Cook's country.

FIELD NOTES ON BIRDS OBSERVED ABOUT MIDWAY BETWEEN TERROR'S CREEK AND MT. MEE DURING THE MONTH OF SEPTEMBER, 1910.*

By W. E. Weatherill.

1. Scrub Turkey (*Catheurus lathami*, Gray). Only to be seen occasionally, owing to the raids made upon it for sporting purposes. Several nests were observed; some were freshly built and others abandoned.

2. Quail. Species not identified.

3. Whampoo Pigeon (*Megaloprepia magnifica*, Temm.). This beautiful pigeon, I am sorry to say, is frequently shot by the farmers, as it is very good eating. It was not very plentiful in this locality during my visit on account of the figs being unripe. The ovaries in the specimens secured were in such a condition as to indicate that the breeding season was close at hand.

4. Topknot Pigeon (*Lophotœmus antarcticus*, Shaw). Locally called the Flock Pigeon. One small flock noticed flying northward.

5. Wonga Pigeon (*Leucosarcia picata*, Lath.). I was informed that this bird had been nearly exterminated in this locality; only two pair were noticed.

6. Spur-wing Plover (*Lobivanellus lobatus*, Lath.). Several noticed on the low ground near the township. The peculiar cries of occasional pairs were heard as they flew over during the night.

7. Land Curlew (*Burhinus grallarius*, Lath.). Several observed during the day, and great numbers heard in the night.

8. White Hawk (*Astur novæ-hollandiæ*, Gmel.). This fine hawk was noticed on several occasions. The local residents informed me that this species breeds there every year.

9. Wedge-tailed Eagle (*Uroœtus audax*, Lath.). One pair observed every day during my stay, sometimes soaring at such a height as to be almost invisible.

10. More-pork (*Ninox boobook*, Lath.). Several calls heard during the night.

11. Blue Mountain Lorikeet (*Trichoglossus novæ-hollandiæ*, Gmelin.). This beautiful though common lorikeet is very numerous in this locality. Just before sunset flocks were seen in the forest.

* Terror's Creek and Mount Mee are about 24 and 30 miles, respectively, N.N.W. of Brisbane.

12. Green Lorikeet (*Psitteuteles chlorolepidotus*, Kahl.). Very numerous in company with the preceeding species, its habits being somewhat similar.

13. Little Lorikeet (*Glossopsittacus pusillis*, Shaw). Occasional flocks were seen flying high above the trees.

14. Lory (*Platycercus elegans*, Gmel.). Several specimens of this species were observed in the forest.

15. Laughing Jack-ass (*Dacelo gigas*, Bodd.). Very numerous among dead trees in the forest, where they seem to secure a good living, Lizards, grasshoppers, etc., and sometimes domestic chickens, are devoured by this bird.

16. Forest King-fisher (*Halcyon macleayi*, Jard. and Selby). Two pair of this species located themselves quite close to the camp, where they were observed catching grasshoppers and small lizards.

17. Bee-cater (*Merops ornatus*, Lath.). One pair of this beautiful species was noticed breeding in a sandy bank quite close to the township of Terror's Creek.

18. Koel (*Eudynamis cyanocephala*, Lath.). Noticed in pairs feeding upon the wild fig in the scrub. Its peculiar cry was often heard during the night.

19. Swamp Pheasant (*Centropus phasianus*, Lath.). Several observed in the tall grass along the Mt. Mee road.

20. Dragoon Bird (*Pitta strepitans*, Temm.). This bird lives in the damp scrubs, where it may be seen scratching among the leaves in search of snails, worms, etc.

21. Bush Canary (*Gerygone albigularis*, Gould). A species rather scarce in this locality, owing to the absence of forest country. Nevertheless, its sweet song could be heard at intervals during the early morning.

22. Rufous Fantail (*Rhipidura rufifrons*, Lath.). This bird, locally called the Scrub Tom Tit, was very numerous in this locality.

23. Leaden Fly-catcher (*Myiagra rubecula*, Lath.). One female observed on the slope of a forest ridge.

24. Spectacled Fly-catcher (*Piezorhynchus gouldi*, Gray). The presence of this beautiful bird was often betaryed by its peculiar scraping notes.

25. Spine-tail (*Orthonyx temmincki*, Vig. and Hors.). This interesting bird is very numerous in this locality. Mr. K. Broadbent informed me that the spines projecting from its tail assist it in its quest for food while scratching among the leaves.

26. Coach-whip Bird (*Psophodes crepitans*, Lath.). The Coach-whip or Stock-whip bird was noticed on several occasions.

27. Tree-tit (*Acanthiza pusilla*, White). While passing through the scrub my attention was attracted by a harsh twitter, loud enough to appear to be uttered by a bird larger

than a sparrow. After investigating matters I found that the merry songster was none other than (*A. pusilla*) some 3 inches in length.

28. Yellow-throated Scrub Wren (*Sericornis barbara*, Lath.). Frequently observed scratching among the leaves in the dense scrub.

29. Large-billed Scrub Wren (*Sericornis magnirostris*, Gould). Very numerous in this locality. The large moss nests of this species were frequently seen.

30. Variegated Wren (*Malurus lamberti*, Vig. and Hors.). Very plentiful in the open forest.

31. Black-headed Wren (*Malurus melanocephalus*, Vig. and Hors.). Observed in company with the preceeding species.

32. Magpie Lark (*Grallina picata*, Lath.). Several individuals noticed, one of which was an albino. Albinos of this species are rare to my knowledge.

33. Magpie (*Gymnorhina tibicen*, Lath.). The magpie is very plentiful in this locality. It may be seen in pairs on the cultivation quite close to the houses.

34. Yellow Thickhead (*Pachycephala pectoralis*, Lath.). This handsome bird is confined to the scrub in this locality, where it is very plentiful. No matter where I halted in the scrub I could call one or more of this species within a few yards.

35. Brown Thickhead (*Pachycephala rufiventris*, Lath.). This species is unlike its congener, the yellow Thickhead, in two respects: (1) It frequents the open forest and farmers' gardens; (2) It is endowed with a splendid gift of song.

36. Yellow Robin (*Eopsaltria chrysorrhoa*, Gould). The Yellow Robin is a most conspicuous object in the scrub, where it may be seen perched upon a twig some 15ft. from the ground, Frequently it will fly to the ground and even remain for some time to capture some unfortunate insect. While doing so it displays the beautiful yellow on the breast and rump.

37. Silver Eye (*Zosterops cærulescens*, Lath.). Noticed in great numbers feeding on the wild fig and other small fruits.

38. Diamond Bird (*Pardalotus punctatus*, Shaw). The bell-like notes of this species are very clear and distinct, but are difficult to locate, chiefly when the bird is feeding in the high gum trees. Several individuals were observed in patches of open forest.

39. Black-headed Diamond Bird (*Pardalotus melanocephalus*, Gld.). Nests of the Chip-Chip were observed in the banks by the roadside. One pair built a nest within a few yards of my tent.

40. White-eared Honey-eater (*Ptilotis chrusotis*, Lath.). Very common in the scrub.

41. Soldier Bird (*Myzantha garrula*, Lath.). Families of this species were seen in the forest and underbrush.

42. Red-browed Finch (*Ægintha temporalis*, Lath.). Observed in small flocks while walking through the long grass.

43. Oriole (*Oriolus sagittarius*, Lath.). While passing through the scrub small groups were to be seen feeding on the wild fig.

44. Fig-bird (*Specotheres maxillaris*, Lath.). Observed in company with the preceding species, but more numerous.

45. Satin-bird (*Ptilonorhynchus violaceus*, Vieill.). Females and immature males were plentiful in one particular fig tree, while on the other hand adult males were entirely absent.

46. Cat-bird (*Aelurœdus viridis*, Lath.). The peculiar cry of this bird could be heard all day anywhere in the scrub.

47. Regent-bird (*Sericulus chrysocephalus*, Lewin.). One small fig tree was simply crowded with females and immature males. Occasionally a coloured male would make his appearance.

48. Rifle-bird (*Ptilorhis paradisea*, Swains). The Rifle-bird is becoming very rare in this locality. Several specimens were observed perched upon tall pine trees in the depth of the largest scrub in the locality.

49. White-eyed Crow (*Corone australis*, Gld.). Occasional groups were seen flying through the open forest.

50. Pied Crow-shrike (*Strepera graculina*, White). The Collywong frequents both the scrub and open forest. When in the scrub it feeds upon the fig, where it selfishly attacks any bird which may wander too close.

STRANGE IDIOSYNCRASIES OF A CORELLA (*Licmetis nasica*).

By Henry Tryon.

It is well known that members of the Parrot tribe acquire in capitivity habits that are very remarkable, when compared with those proper to their wild and free-life; habits, that relate both to their utterances and to their simple movements and to their more complex actions. Some of these are the outcome of training bestowed upon them, some are imitative, and others again appear to be spontaneous without definite antecedent cause.

Amongst acquirements of this nature may be mentioned those about to be related, and that have reference to the

strange goings on of a Corella Cockatoo (*Licmetis nasica*), that had been domesticated, for the recital of which the writer is beholden to Mr. E. B. Kellaway, of Brisbane.

Now, about two years ago (the statement was made on 15th October, 1910), a Corella visited a fowl-yard connected with a certain tenement at Kangaroo Point, and took up its quarters there. It had the appearance of a "caged bird," but no one knew whence it came. To be more particular, it made friends with one of the hens there. Thus not only did it resort to its presence, but when this hen went to roost, Corella would perch and settle alongside it. Again, when the hen got broody and was sitting, it would with little intermission keep beside it. Moreover, it fed with the other fowls of the yard, partaking of whatever was offered to them. But after some time the hen took sick and in due course died. Corella thereupon disappeared for a while, but after many days visited the fowl yard where it formerly dwelt. No longer, however, was it bent on consorting with a gallinaceous bird, but, however, soon commenced to display an opposite habit almost as remarkable as the former one. In fact it manifested a wonderful *penchant* for eggs. At first this was evinced in the fowl yard in which it was already a familiar denizen, and eggs of the constituents of this alone claimed its attention. Perched on some coign of vantage, where it was not always observed, no sooner would a hen cackle to announce her joy, than it would swoop down to the nest, stick its long beak into the delicate object, fly off for a greater or less distance, and then feast on whatever of the contents were remaining.

Latterly it extended similar attention to other fowl runs, including the one attached to Mr. Kellaway's own house, and this afforded a full opportunity of observing its habits. He found that to ingratiate itself with the prolific hen it would imitate the cackling that this gave utterance to before depriving it of its prize, and so bold was it that Mrs. Kellaway had seen it more than once fly right inside the fowl-house and take the egg just deposited. It not only evinced this remarkable cupidity, but a degree of cunning was exercised in its display. Thus, on one occasion, Mr. Kellaway heard a neighbour's hen cackling. Meanwhile Corella was perched on the ridge of a house at no great distance. Like a hawk it soon swooped down, and hovering over the fowl yard, circled around and again perched. This manœuvre was evidently occasioned by the fact of a man working in the yard where the fowls ran, and who was not visible from its look-out. For it now perched on the top of a fence, hidden by a tree that intervened between it and him, and here awaited its opportunity. And soon when the man had disappeared, having finished

what he was doing, Corella flew down again and so secured the egg. As one may have remarked, the Corella, with its long curved beek and partially bare face, presents a facial expression that would bespeak craftiness, even were it not displayed—as so often happened—in the case of this erstwhile pet.

BIBLIOGRAPHY.

THE PINES OF AUSTRALIA.*

The Technological Museum of New South Wales has prepared, and the Department of Public Instruction of that State has issued, a work (now before the members) of singular interest and importance, the outcome of an exhaustive investigation pertaining to our Australian Coniferæ, in which Messrs. R. T. Baker and H. G. Smith—who have already earned fame through their joint "Research on the Eucalypts"—have, whilst keeping sight of the commercial value of the important asset that these trees constitute, regarded them from both a chemical and botanical standpoint, using these terms in their fullest significance. Obviously, the most predominant genus of the group alluded to, *i.e.*, *Callitris* (Cypress Pine), with its 18 species, claims the fullest treatment in it, but ample consideration also is bestowed on the trees included in *Araucaria* (Hoop Pine, White Pine, Bunya Pine), *Podocarpus*, *Agathis* (Kauri), *Phyllocladus*, and other genera indigenous to the territories of the Commonwealth. The Cypress Pines—exclusively Australian trees—moreover receive at the hands of the authors prior consideration: a general account of them, under no less than 21 different headings, being followed by the separate treatment of each individual kind, due attention being given to (1) history of the species; (2) its systematic relations; (3) the leaves; (4) the wood; and (5) the bark; in each case separate divisions being allotted to the economics, anatomy and chemistry of these. And this mode of treatment is pursued also with respect to the trees of other coniferous genera.

The comprehensiveness of the monograph before us may be concluded from the fact that it embraces more than 450 pages 4to. of letterpress, a large number of plates, and no less than 298 figures. These illustrations, in addition to portraying the characteristic features of the trees themselves, largely deal with the microscopical structure of their leading tissues—comprised severally in wood, bark, leaf,

* *Baker* (R.T., F.L.S.) & *Smith* (H.G., F.C.S.)—"A Research on the Pines of Australia." Tech. Ed. Series, No. 16, Technological Museum, N.S. Wales, Sydney, by authority, 1910.

fruit, etc.—that are passed in review, and are all photographic representations; a special feature being the clear portrayal of suitably prepared "mounts" by natural colour photography. Again, not only is a full and exact description given of the characteristic features that the different structures and essential organs present, but allusion is also made to their physiological significance. And further, the origin, mode of occurrence, and physical and chemical properties of the various products that our pines are capable of yielding, as well as their quantative estimation, is made the subject of special treatment and discussion. Thus we find no less than 12 pages devoted to the gum-resin exudate of our ordinary White Pine. Passing over interesting discoveries relating to morphology, allusion must be made to the following important discoveries that are announced and have received extended treatment:—Guaiol in the timbers of Callitris species; the tanning value of their barks: their sandarac resins: a manganese compound of general occurrence in Australian Coniferæ: pinene —"commercial oil of turpentine," in the Kauri Pine. And, as bestowing added value to the scientific and economic disclosures of "A Research on the Pines of Australia," may be mentioned, the full statement of the methods through the adoption of which these have been brought about, a feature that the student and savant alike will fully appreciate.—(H.T.).

DONATIONS TO THE LIBRARY.

The following donations to the Library have been received since the last issue:—From Field Naturalists' Club of Victoria, *The Victorian Naturalist*, for November and December. From Tasmanian Field Naturalists' Club, *The Tasmanian Naturalist*, October, and Report of Easter Camp-Out, 1910. From the Editor, *Knowledge*, for October, November and December. From Queensland Geological Survey, Report on certain Mines and Mineral Fields in North Queensland, by L. C. Ball; Field Notes on Mount Flora Gold and Mineral Fields, by L. C. Ball; Some Mineral Fields in the Hinterland of Mackay, by L. C. Ball; Sketch Map of East Central Queensland. From Queensland Museum, Annals Nos. 1 to 4 and 6 to 9. From Government Botanist, Brisbane, Miscellaneous Reprints. From Government Botanist, Sydney, A Critical Revision of the Genus Eucalyptus, Parts 1 to 12, and Miscellaneous Reprints. From Government Botanist, Melbourne, Plants Indigenous to Victoria, Vol. II., and Miscellaneous Reprints. From Government Entomologist, Sydney, Miscellaneous

Reprints. From H. Tryon, Notes on the Wild Cochineal Insect, &c., and Notes on the Protection of Native Birds in Queensland. From Royal Australasian Ornithologists' Union, *The Emu*, December (special number dealing with the Tenth (Brisbane) Session).

CANNIBALISTIC ROTIFERS.

In the December number of *Knowledge*, Mr. Charles F. Rousselet, the well-known authority on Rotifers, writes of the cannibalistic tendencies of these microscopic animals. The devouring of its own kith and kin is not common among the Rotifera, but *Ploesoma hudsoni* is not at all scrupulous in this respect. "Of all the Rotifers this is the most vigorous swimmer: it rushes through the water at great speed, snapping at any other Rotifer that comes in its way, carrying it in its mouth and devouring it without a moment's pause. It is not at all particular as to whether its victim is a *Synchaeta* or its own sister or cousin" Mr. Rousselet witnessed a case where one Rotifer was swallowed by a second, and the latter was in turn captured by a third Ploesoma, and he stopped the tragedy by killing and mounting all the *dramatis personæ* in the midde of the performance. Mr. W. R. Colledge informs us that he has not so far taken *Ploesoma hudsoni* in the vicinity of Brisbane, the only species of that genus obtained by him being *Ploesoma lenticulare*. At one of the meetings of the Club last year Mr. Colledge stated that *Asplanchna amphora*, one of the largest species in Australia, was also cannibalistic. On lifting one by a pipette from its native element he dropped it rather sharply on a microscopic slide. The shock it sustained by the process disturbed its nervous equilibrium, and it apparently felt sick. So it began to relieve itself of the contents of its stomach by using its loosely attached incudate jaws as forceps. These plunged into the interior of its digestive organ, pulled out the half-digested form of a Rotifer of its own kind, and laid it down on the slide. Another dip into the bag, and up came a *Brachionus rubens*; then followed three *Anuraeas*, and lastly a *Scirtopoda*. These were all laid side by side. How many more were contained in its capacious maw he did not know, for it here succumbed to the shock and the subsequent surgical operation, but from appearances there must have been at least half a dozen left as a testimony of gormandizing propensities.

THE

Queensland Naturalist.

THE ORGAN OF THE FIELD NATURALISTS' CLUB
AND ITS BRANCHES

VOL. I. MAY 31, 1911. No. 9.

PROCEEDINGS.

ANNUAL MEETING, 26th JANUARY, 1911.

Chairman : W. R. Colledge. Attendance, 25.

Annual Report : The Report of the Committee for 1910 was read and adopted, after amendment (*vide* Transactions, p. 197).

Expression of Sympathy : It was decided to place on record the Club's sympathy with the relatives of the late Kendall Broadbent, and its sense of the loss occasioned to science by the death of such an able naturalist.

Presidential Address : The retiring President delivered an address on "The Ideal of a Field Naturalist" (*vide* Transactions, p. 200).

Office-Bearers : The election of office-bearers for 1911 resulted as follows :—*President*, H. Tryon ; *Vice-President*, G. H. Barker ; *Committee*, Mrs. T. Pattinson, Miss D. Sutton, R. Illidge, W. M. Tanner, S. B. J. Skertchly and C. White ; *Hon. Secretary and Treasurer*, C. W. Holland.

Proposed Honorarium : W. R. Colledge proposed that an honorarium of £10 be granted to the Hon. Secretary. S. B. J. Skertchly and H. Tryon supported the proposal. The Hon. Secretary expressed appreciation of the suggested action, and asked to be allowed to decline the honorarium. The sense of the meeting was in favour of the proposal, but the matter was left to the incoming Committee to deal with.

Exhibits : Cases illustrating the life-histories of the Potato Lady Bird ((*Epilachna*, 28-*punctata*), and Pumpkin Beetle (*Aulacophora australis*), prepared by E. Jarvis, by H. Tryon ; Minerals, by R. Varney ; Phasma (*Cyphocrania goliath*), by Miss Clarke.

EVENING MEETING, 23rd FEBRUARY, 1911.

Chairman : H. Tryon. Attendance, 23.

Emblem : An emblem for the Club—the Native Bee (*Trigona*)—designed by the President, was adopted, subject to the omission of the legend *Apis modo*.

Paper : Botanic Notes, No. 1. by C. T. White (*vide* Transactions, p. 204).

Exhibit : Fruit of *Endiandra insignis*, by C. T. White, who stated regarding it as follows :—It is eaten by the aboriginals. The nuts are roasted by them, cracked, and and the kernels, after being pounded between round and flat stones, are placed in a dilly bag and immersed in water for a few hours—sometimes all night.

EXCURSION, 11th MARCH, 1911.

Sherwood : Attendance, 22.

The majority of the party were taken for a geological ramble under the guidance of Prof. S. B. J. Skertchly. Other sections of the Club devoted the time available to Entomology and Pond Life. Later in the afternoon they all assembled at the house of Dr. A. Jefferis Turner, by whom and Mrs. Turner they were entertained at afternoon tea. Dr. Turner then exhibited his splendid collection of moths and butterflies, in the examination of which some time was spent. A hearty vote of thanks was passed to Dr. and Mrs. Turner for their kindness, and the party returned to town about six o'clock.

EVENING MEETING, 23rd MARCH, 1911.

This Meeting took the form of a Conversazione—for report *vide* p. 209.

TRANSACTIONS.

REPORT OF COMMITTEE FOR 1910.

Your Committee have much pleasure in presenting the fifth annual report.

The following office-bearers were elected at the annual meeting held on 27th January, 1910, viz. :—*President*, W. R. Colledge ; *Vice-President*, Jos. Wedd ; *Committee*, Miss E. Brabazon, Miss A. Fortescue, G. H. Barker, E. Hurworth, H. Tryon, and C. White ; *Hon. Secretary and Treasurer*, C. W. Holland. In pursuance of Rule VII, S. B. J. Skertchly was a member of the Committe ex officio as Immediate Past President.

Fourteen meetings of the Committee were held, and the attendances of members were as folows :—W. R. Colledge, 11 ; Jos. Wedd, 6; Miss E. Brabazon, 4 ; Miss A. Fortescue, 4 ; G. H. Barker, 8 ; E. Hurworth, 1 ; S. B. J. Skertchly, 10 ; H. Tryon, 10 ; C. White, 13.

Twelve new members were elected during the year, and the Club has now a roll of 106. It will be necessary shortly to revise the roll and remove therefrom the names of those who, having allowed their subscriptions to fall into arrear, have practically ceased to be members.

Twelve evening meetings were held, and the attendance averaged 19, as against 25 in 1909.

It became expedient early in the year to vacate the room in the Central Technical College hitherto used for the evening meetings, and one was obtained in the School of Arts. Later in the year, however, commodious rooms were secured at Petrie's Bight on very reasonable terms.

Nine excursions took place, the localities visited being One Tree Hill, Sandgate, Goodna, Glass House Mountains (3 days' camp), Nudgee, Petrie's Quarry, Northgate Junction, Newmarket and Fernecy Flat. Like the evening meetings, the attendances were slightly below those of the previous year.

The Club placed on record their deep sense of the loss occasioned to the Empire by the death of His Majesty King Edward VII.

An event of some importance was the first visit to Queensland of the Royal Australasian Ornithologists' Union, which took place in October. The Club having offered assistance, were entrusted by the Union with the arrangements for the Brisbane Session of three days. Mr.

H. Tryon acted as Hon. Secretary for the occasion, and to him special thanks are due for the able manner in which he organized and carried out a most satisfactory programme.

Your Committee deem this a suitable opportunity to refer to the recent conferring of the Companionship of the order of St. Michael and St. George upon Mr. F. M. Bailey, F.L.S., Government Botanist. The honouring of the veteran botanist in this way was a fitting tribute to his genius.

Although the late Mr. Tom Petrie was not a naturalist, your Committee deem it not out of place to refer in this report to the passing away of the deceased gentleman, who was a true lover of Nature and the firm friend of the aboriginals. His kindly temperament endeared him to all, and your Committee desire to place on record their great sorrow at his death.

The Club were invited to appoint a delegate to the Session of the Australasian Association for the Advancement of Science held in Sydney during the current month, and Prof. S. B. J. Skertchly was appointed as the Club's representative

Four numbers of *The Queensland Naturalist* were issued during the year, and it is expected that the Club will now be able to continue the publication regularly every quarter.

Some valuable exchanges were arranged for, and others have been invited.

Appended is a statement of receipts and expenditure, which shows that on 31st December the Club had a credit balance of £16 6s. 7d.

W. R. COLLEDGE,
President.

C. W. HOLLAND,
Hon. Secretary.

16th January, 1911.

Statement of Receipts and Expenditure for the year 1910.

RECEIPTS.	£	s.	d.	EXPENDITURE.	£	s.	d.
To Balance from 1909 ..	14	11	9	By Printing	1	15	6
,, Subscriptions—				,, Advertising	0	7	6
Arrears £8 0 0				,, Postage	2	17	7
1910 .. 22 15 0				,, Rent, School of Arts ..	2	5	6
1911 .. 0 15 0				,, Rent, Petrie's Bight ..	1	0	0
——-——	31	10	0	,, Stationery	0	6	3
,, Balance from Naturalist Account ..	0	18	9	,, Bookbinding	1	4	0
,, Donation by Mr. Colledge, a/c sale photos	0	13	0	,, Badges and cloth ..	0	6	8
,, Interest Government Savings Bank ..	0	12	10	,, Fees Government Savings Bank ..	0	2	0
,, Sales of Naturalist ..	0	4	6	,, Naturalist—			
				Printing, 4/7 £21 2 9			
				Postage .. 0 16 6			
				——-——	21	19	3
				,, In Govt. Savings Bank	15	1	10
				,, Cash in hand ..	1	4	9
	£48	10	10		£48	10	10

C. W. HOLLAND,
Hon. Secretary and Treas.

Examined and found correct
A. E. JONES, A.I.A.Q.,
Hon. Auditor.

PRESIDENTIAL ADDRESS.

By *W. R. Colledge.*

THE IDEAL OF A FIELD NATURALIST.

In vacating the office of President, I must express my indebtedness to many of our members for much information given, and much forbearance exercised to my own shortcomings. The path of duty has been strewn with flowers of friendship, and my work lightened by genial sympathy and kindly appreciation. Our Club seeks to fulfil a very useful function. In the artificial conditions which surround us, the main portion of our time is occupied in securing the means of subsistence. The office, the counter, the workshop or the school claim the best portion of the day. The sunny hours are filled with routine work. And though that occupation ought to be suited to our abilities and congenial to our taste, so that it gives real pleasure and the satisfactory assurance that we are thus fulfilling a useful place in the great world's work, yet this may absorb us too completely. The hand of routine may lie too heavily, and depress those rich and delicate aspirations which link us to a larger life, and we become more isolated than we might otherwise be. In our reflective moments the plaint of the poet comes home to us with some measure of truth :—

"The world is too much with us; late and soon,
Getting and spending, we lay waste our powers:
Little we see in Nature that is ours;
We have given our hearts away, a sordid boon!
This sea that bares her bosom to the moon;
The winds that will be howling at all hours,
And are up-gathered now like sleeping flowers,
For this, for everything, we are out of tune;
It moves us not—Great God! I'd rather be
A Pagan suckled in a creed out-worn;
So might I, standing on this pleasant lea,
Have glimpses that would make me less forlorn;
Have sight of Proteus, rising from the sea;
Or hear old Triton blow his wreathed horn."

Against this tendency our Club is a safeguard. And if Wordsworth had been living now, he need not have wished for a reversion to old Pagan days, but only needed to become a live member of our Club to place him on high vantage ground and open up the objects upon which his heart was set. We have been reminded, time after time, in eloquent terms by Professor Skertchly that we are

a Club—not a purely scientific society, piling up geologic fossils; making collections of botanical specimens; pinning up rows of beautiful butterflies, well ordered series of moths or arrangements of strange beetles; nor collecting exquisite forms of dainty rotifers and specimens of graceful birds to dumbly stare at us from behind glass casements. These are useful in their way, helps to the remembrance of orderly scientific arrangements, but they are not the objects of our work, and do not represent the highest spirit of the Club. We are to be Nature's students, in our own ways unfettered and free: no text books to master or examinations to pass. Our eyes open to the infinite gradations of Nature's gorgeous colours, to the wondrous adaptibility of her living forms to meet changing conditions of climate or of foe; our ears tuned to catch some of the music of the trees as they bend and sway in the soft grasp of the wind, and every branch and leaf quivers joyously as at the meeting of a friend. The swift dash of a bird and its joyous notes waken a responsive echo in our hearts. Who has not experienced this? Have not our souls been uplifted in some of our excursions as we have been awed by the majesty of the hills, and thought how calmly they have stood there while generations of men have passed under their shadow and mouldered into dust? The high places where we climbed to peer over precipices, and deep fissures telling of the mighty convulsions which ages ago shook the mountain's breast, have made us realise how weak and insignificant we are in the presence of such scenes. And then as the sunbeams falling athwart the gloom dispel the mist, so the splash of falling water hurrying down the steep cliffs has stirred us with pleasure—the contagious pleasure of the laughing waters—as they rushed down to spray the feathery ferns and leave their blessing on the parched grass and drooping flowers. And as the mists arose, our thoughts have followed them in their ascent to the sky, as the sun dyed them in sheen of purple, crimson, and gold. Then came the passing of gold into grey, the union of the misty particles with each other to softly fall upon the dry mountain's brow, there to steal through mossy nooks in trickling channels, which by and bye burst forth in streams wreathed with hurrying foam.

Do not the memories of these scenes arise, lifting us above our ordinary life, so that the best part of our nature has gone out and held communion with the unseen. Oh! I think it is good to keep before us the ideal club life; not to permit ourselves to be isolated into units or detachments as we are so prone to do, and in which I confess myself to have been a sinner, but to seek to preserve the entirety of the organism.

Mr. J. A. Leach told us that in the Field Club in Victoria there were those who confined themselves entirely to one subject: one buried himself in botany, another only saw geologic specimens, and another's eyes only sparkled at a butterfly. There is much to be said in excuse of this attitude. These separate sciences have grown so large that a lifetime is needed to master them. Our time is short; opportunities are limited. If we attempt too much we run the risk of having a smattering of many things, but may be masters of none. The role of the successful student is to stick to his own particular department until, if possible, it is mastered. But one evil to be guarded against is the tendency to isolation, the detachment of a particular series of facts from their environment, and the overlooking of the relationship they sustain to other things. To take the bird away from its trees and sunny air, and stuff it on a pedestal with a pair of glass eyes, is to take away its life and inspiration. To pluck the fern from where it quivers under the weight of its jewelled dew drops and dry it in a book, prisoned with strips of paper, is to destroy its grace and beauty. Ah! how soon do the gorgeous tints of the flower fade when plucked! The rich shades of the butterfly or the colours of the beetle may not change so much, but still they are not the same as when the one alighting on the delicate petal of a flower without its bending, uncurled its curious tongue and sipped the nectar from the sweet depths of the cup, or the other clasped the branch in its spiny feet, and peered into dark depths in quest of food. The fairy little rotifers, too, how much they lose when prisoned in a microscopic mount. They are no more like their former selves than the mummied figure of Pharoah's daughter is like the graceful girl whose laughter echoed among the reeds of the River Nile. Ah! we must not lay too much stress upon our collections, valued though they be, but ever rise above them to the relationships they sustained and the work they fulfilled, so as to grasp the larger views of far-reaching connexions.

This pre-supposes that we each have some acquaintance with the sciences that enter into the life of our Club. The knowledge need not be very extensive, but it must be sufficient to enable us to grasp intelligently the objects pointed out to us in our work. When Professor Skertchly leads us to the accumulations of gravel at Sherwood and declares that they are the evidences of glacial action, and that once huge mountains of ice slid over the ground upon which we now stand (a consummation which we only wish in the sultry days might occur again), or points out in Petrie's Quarry certain remains of volcanic action, we do not want to believe it on his authority only, but we should have sufficient knowledge of geologic facts so as

to grasp the evidences adduced, so that we may have an intelligent hold of the reasons upon which the opinion is based. And thus we can either differ from, or strengthen his position. So with regard to Botany. An acquaintance with it furnishes continual pleasure, as fresh objects of interest rise before us. Under such expert interpreters as Mr. Tryon, Mr. Wedd, or our young friend Cyril White, what tales have the woods not told? And how specially interesting under the circumstances in which they were given? We have learned that just as human beings carry their peculiarities of garb and language to whatever land they go, so some of these trees and shrubs tell of other climes from which they came, before the bridge across Torres Strait was broken, and Australia insulated—the Queen of the Southern Seas. These denizens have not forgotten to clothe themselves in garments of the pattern worn by their relatives in other lands than these. And how pleasant it is to find in some quiet nook some plant or flower, identical with some we knew in another land and in a cooler clime! They wake keen memories of bygone days, when the glamour of youth lay over us, and Nature's aspects and voices thrilled us even more deeply than they do now. And the old pictures are made all the more distinctive by the gay shrubs and gorgeous flowering trees of our present almost tropical home.

And are we not fortunate in having always at our service so experienced and capable an Entomologist as our very retiring member, Mr. Illidge, always ready and ever willing to lead and advise any one upon the beautiful moths and butterflies that come to cheer us with their company. How often he has pointed out those plants which for some mysterious reason are chosen in preference to others for nurseries and nourishment for their young. The unfolding of the plant thus is linked with the unfolding of the insect. Isolation does not exist in nature. The bud opens its gorgeous petals, and speaks in its still strong voice of colour-tone to the gay winged insect floating upon the breeze. Freely its cup of nectar is held out for the detached—the motile—flowers to drink, and be satisfied. Each responds to the other. The one gives its best, the other gladly receives it, and joyously goes on its way. A lesson fraught with much meaning.

So let us strive to maintain the many-sided continuity of our Club. As all sciences are only manifestations of Nature's one great spirit, so in vaying paths let us pursue the one great object—the knowledge of, because we love, all things around. Individually, we may not do much to advance any science, but do not let that discourage us. If we have no fat portfolios of plants, complete sections of butterflies, series of rock or minerals to show; yet

we have all gained much. Our eyes, ears and hearts have become more responsive to Nature's language. We have held communion with her, pure pleasures have come to us which no gold can buy, and we are all wiser and happier for the gifts, Like Wordsworth, we can say :—

"And I have felt
A presence that disturbs me with the joy
Of elevated thoughts ; a sense sublime
Of something far more deeply interfused ;
Whose dwelling is the light of setting suns,
And the round ocean, and the living air,
And the blue sky, and in the mind of man ;
A motion and a spirit that impels
All thinking things, all objects of all thought,
And rolls through all things. Therefore am I still
A lover of the meadows and the woods
And mountains : and of all that we behold
From this green earth ; of all the mighty world,
Of eye and ear, both what they half create,
And what perceive : well pleased to recognise
In Nature, and the language of the sense.
The anchor of my purest thoughts, the nurse,
The guide, the guardian of my heart, and soul
Of all my moral being."

Thus our Club life will knit us more closely together, and sow a harvest of fragrant memories to be reaped in days to come.

BOTANIC NOTES, No. 1.

By C. T. White.

NEPHELIUM CALLARRIE, *Bail.* (Sapind).
Blackall Range. Jas. Keys.

HARPULLIA FRUTESCENS, *Bail.* (Sapind).
Macpherson Range. C. T. White.

The above two sapindaceous plants have not previously, I believe, been met with out of the tropical portion of Queensland.

OXYLOBIUM ACICULIFERUM, *Benth.* (Legumin). *Bth. Fl. Austr., II., p.* 25. *Bail. Ql. Fl., p.* 33.

Pod : stipitate incurved or almost straight, transversely veined, 4 or 5 lines long, pubescent (very similar to that of O. trilobatum, *Benth.*)

Seeds not strophiolate ; about $1\frac{1}{4}$ lines long ; about 4 in a pod.

Pine Mountain (nr. Brisbane). Field Naturalists' Club.

PULTENÆA PETIOLARIS, *A. Cunn.* (Legumin.). *Benth. Fl. Austr., II., p.* 115. *Bail., Ql. Fl., p.* 356.

Pod: flattened, hirsute (covered with long silky hairs in the young state), oblique, acuminate, nearly 4 lines long, exceeding the calyx, usually only one-seeded.

Mt. Gravatt (nr. Brisbane). F. Nat. Club. Excur.

PULTENÆA ECHINULA, *Sieb.* (Legumin.) *Benth., Fl. Austr., II., p.* 127. *Bail., Ql. Fl., p.* 358. *Moore and Betche., Hbk., Fl. N S.W., p.* 137.

Pod: exceeding the calyx, about 3 lines long, 2 lines broad, hirsute, acute.

Described from specimens collected on Blue Mountains, N.S.W.; the above description is given, as the pod seems never to have previously been described. In the Fl. Austr., this plant is recorded from Brisbane River (*Fraser* ?), but does not seem to have since been met with in Queensland. Members might keep a look out for it on our excursions.

ZORNIA DIPHYLLA, *Pers. var.* STIRLINGI, *Bail.* (Legumin)., *Ql. Agric. Jl., XV.*, 491.

In some specimens collected at Stannary Hills by Dr. T. L. Bancroft, the *pods* were composed of 4 echinate articles.

PITHECOLOBIUM LOVELLÆ, *Bail* (Legumin.). *Ql. Bot. Bull., VIII., p.* 74. *Ql. Fl., p.* 521.

Pod: woody, several inches long, about 8 lines broad, much twisted, reddish inside when fresh, *Seeds* black and shining, ovate 4 or 5 lines long. *Funicle* folded under the seed.

Lake Cootharaba. Jas. Keys. First record of the plant being found on the mainland.

EUCALYPTUS TERETICORNIS, *Sm.* (Mrytaceæ).

Nerang Creek. W. J. Scott. A form with red filaments.

RANDIA HIRTA, *F.v. M.* (Rubiaceæ). *Bail., Ql. Fl., p.* 753, *Pl. XXVII.* Gardenia hirta, *F.v.M. Fragm., VII.*, 46.

Fruit: oblong, about 1in. long, nearly $\frac{3}{4}$in. broad, hairy, crowned by the long calyx limb *Seeds* numerous, about 3 lines long, immersed in a (? pulpy) placenta In its younger stage the fruit is very pubescent, and with the calyx limb somewhat pear-shaped.

RANDIA MOOREI, *F. M.* (Rubiaceæ). *Benth., Fl. Austr., III., p.* 411. *Bail., Ql. Fl., p.* 754. *Moore and Betche, Hbk. Fl. N.S.W., p.* 248.

Young growth slightly tomentose. Anthers linear, about $1\frac{1}{2}$ lines long. Style linear, about 5 lines long, stigmatic lobes two. Fruit about 4 lines long, $2\frac{1}{2}$ lines broad; sedes several, angular.

Currumbin Creek. O. O'Brien. Tweed River and adjoining scrubs, J. H. Simmonds.

The above notes and figure are from recently collected material.

MYRSINE ACHRADIFOLIA, *Fr. M.* (Myrsincæ).

Fruit: globular, about 2 lines diameter.

Lake Barrine (N.Q.), J. F. Bailey.

I take this opportunity of giving figures and descriptions of the mature fruit of the two following Queensland species of Maesa:—

M DEPENDENS, *Fr. M. var* PUBESCENS, *F. v. M.*

Fruit: globular when young, ovoid or nearly globular when mature. *Seeds*: numerous, angular, brown.

M HAPLOBOTRYS, *F. v. M.*

Mature fruit: nearly globular. *Seeds*: numerous, angular, black, and rugose.

The above two Myrsinaceous plants, first recorded from Rockingham Bay, have lately been met with in several other tropical localities in Queensland.

ALYXIA RUSCIFOLIA, *R. Br.* (Apocyn). *Prod.* 470. *Lodd. Bot. Cab.*, 1811. *B.M.* 3312.

The various forms of this handsome shrub are frequently met with on the Club's excursions about Brisbane, and the following notes and figures may be of interest:—

The *leaves* are commonly in whorls of 3, 4, or 5, and sometimes at the ends of the branchlets in whorls of 6 or 7.

ALYXIA ILICIFOLIA, *F. v. M.* (Apocyn.)

This shrub, first recorded from Rockingham Bay, has since been met with in other localities. The *leaves* sometimes attain the length of 5 inches; the smaller ones in some cases with rather numerous teeth; they seem to be usually in whorls of three.

A shrub about 6 feet high. (A Meston's Bellenden Ker Exp'd., 1904.)

IPOMÆA ALATA, *R. Br.* (Convol.). *Benth. Fl. Austr., IV., p.* 418. *Bail., Ql. Fl., p.* 1060.

Thursday Island. Thos. Tate. Complete material. The *seeds* are black and about 4 lines in diameter.

IPOMÆA TURPETHUM, *R. Br.* (Convol.)

Currumbin Creek and Tweed Heads. O. O'Brien.

*DATURA METEL, *Linn.* (Solan). *B.M.*, 1440.

Naturalised waste places about Brisbane. C. T. White.

Plant, annual, pubescent. *Leaves* entire or toothed Flowers, whitish. Capsule, globose, exhinate, nodding.

*NICOTIANA GLAUCA, *R. Graham* (Solan.). *B.M.*, 2837.

This South American plant, which has for some time been naturalised in Western Queensland, has within the last few years established itself in several places along the Brisbane River.

SCOPARIA DULCIS, *Linn.* (Scroph.).

Brisbane River. F. Nat. Club Excur.

*ALTERNANTHERA ACHYRANTHA, *R. Br.*, *var.* LEIANTHA, *Seubert* (Amarant.). *Mart. Fl. Brasil, V.* 183, *pl.* LV.

This troublesome little weed, first recorded from the Springsure district by Mr. J. H. Maiden (under the name of *A. echinata*, Sm.), has now established itself about Brisbane, and several other Southern localities.

ALTERNANTHERA DECIPIENS, *Benth.* (Amarant). *Fl. Austr., V.*, 251.

Rockhampton. J. Cleminson.

AMARANTUS MITCHELLII, *Benth.* (Amarant).

AMARANTUS MACROCARPUS, *Benth.* (Amarant).

KOCHIA BREVIFOLIA, *R. Br.* (Chenopod).

DYSPHANIA MYRIOCEPHALA, *Benth.* (Hlecebraceæ.)

The above four inland plants are now and again met with round about Brisbane.

PIPER BANKSII, *Miq.* (Piperaceæ). *Benth., Fl. Austr., VI.*, 205. *Bail., Ql. Fl., p.* 1285.

Male spikes. Leaf opposed, slender, 1-1¼ inches long on peduncles of about ¼ inch; stamens 2, slightly exserted; bracts orbicular-peltate. The female spikes sometimes attain the length of 5 inches.

ENDIANDIA INSIGNIS, *Bail.* (Laurineæ). *Ql. Fl., p.* 1307.

Tambourine Mountain, J. H. Simmonds, J. Shirley. Scrubs, North Coast Railway, Dr. T. L. Bancroft.

The leaves in these southern specimens seem smaller than in those from the tropics.

GREVILLEA LEIOPHYLLA, *F. v. M.* (Proteaceæ). *Benth., Fl. Austr., V.*, 471. *Bailey, Ql, Fl., p.* 1344.

Fruit: about ½in. long, ¼in. broad, opening in 2 valves of thin texture; very similar to that of *G. linearis*, *R. Br.*

VISCUM ORIENTALE, *Willd.* (Loranth). *Blume, Fl. Jav.* (Loranth), 24 and 25.

Stannary Hills (N.Q.). Dr. T. L. Bancroft.

EUPHORBIA CARISSOIDES, *Bail., Q. Agric. Jl. XVI.* (1906), 449 (Euphorbiaeæ).

Capsule, depressed-globular, about 2½ lines diam.; cocci fairly smooth; *styles*, undivided, recurved; *seeds*, 1 line long, minutely pitted, reddish, bluntly 4-angular, angles white.

PETALOSTIGMA BANKSII, *Britten & S. Moore*, in *Journ., Bot.*, 1903. 225., *t*453 (Euphorb.) *Bot., Cook., Voy.*, 87., *t*286.

Sweers Is., Gulf of Carpentaria. J. F. Bailey, 1901.

Leaves, glossy on the upper surface in this freshly gathered material, but not so marked as in *P. quadriloculare, F. v. M.* Originally described from fruiting specimens collected at Endeavour River, by Banks and Solander (1770), and flowering specimens collected on the Islands of the Gulf of Carpentaria, by Dr. Robt. Brown (1802).

ASTREBLA PECTINATA, *F. v. M. var.* curvifolia, *Bail.* (Gramineæ).

Roma. C. T. White.

EXPLANATION OF PLATE.

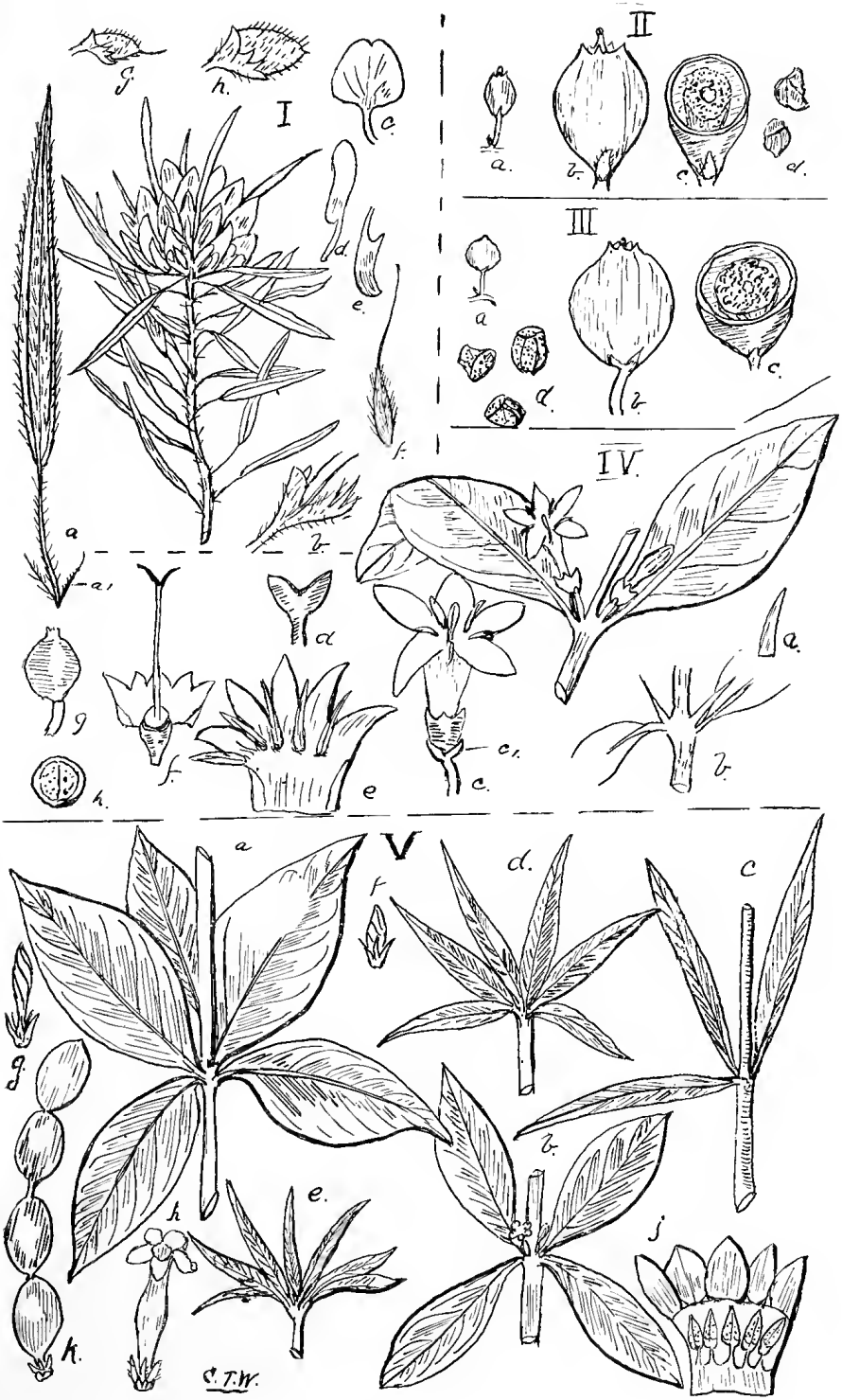
I. *Pultenæa petiolaris.* (*a*) leaf enlarged to show recurved margins and long petiole; (*a*1) stipules; (*b*) calyx and appendages; (*c*) standard; (*d*) a wing petal; (*e*) a keel petal; (*f*) pistil; (*g*) pod, nat. size; (*h*) same slightly enlarged.

II. *Maesa dependens var. pubescens.* (*a*) fruit, nat. size; (*b*) same enlarged; (*c*) transverse section of fruit; (*d*) seeds enlarged.

III. *Maesa haplobotrys.* (*a*) fruit, nat. size; (*b*) same enlarged; (*c*) transverse section of fruit; (*d*) seed enlarged.

IV. *Randia Moorei.* (*a*) a stipule; (*b*) axillary spines; (*c*) flower, enlarged; (*c*1) bracteoles; (*d*) bracteoles at base of calyx much enlarged; (*e*) top portion of corolla laid open; (*g*) a fruit, nat. size; (*h*) section of fruit, nat. size.

V. *Alyxia ruscifolia.* (*a*) a specimen of the normal form with five leaves in a whorl; (*b*) the same with four leaves; (*c*) a specimen of *var. pugioniformis*, Bail. Ql. Fl., p. 979, with three leaves in a whorl; (*d*) the same with six leaves in a whorl at the end of a branchlet; (*e*) a specimen of *var. ulicina*, Bail., Ql. Fl., p. 979, with seven leaves in a whorl at the end of a branchlet; (*f, g, and h*) flower in various stages; (*j*) top portion of corolla laid open; (*k*) fruit. *A, b, c, d, e,* and *h*, nat. size. *f, g, h,* and *j*, enlarged.



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DONATIONS TO THE LIBRARY.

The following donations to the Library have been received since the last issue :—From Field Naturalists' Club of Victoria, *The Victorian Naturalist* for January, February and March. From the Editor, *Knowledge* for January and February. From Department of Agriculture, Melbourne, *Journal of Agriculture* for January, February, and March. From Cyril White, Australian Mosses, by V. F. Brotherus, Parts 3, 4, and 5. From Hull Society of Natural Science, Proceedings, Vol. 1, Part 1. From Selborne Society, *The Selborne Magazine* for January and February. From the Editor, *The Country-Side Monthly*, Vol. 1, Nos. 1 to 6 ; Vol 2, Nos 1. and 2. From the Director, Missouri Botanical Gardens, Reports for 1908, 1909, and 1910. From American Museum of Natural History, Journal, for January From Perthshire Society of Natural Science, Proceedings, Vol. V., Part 2.

CONVERSAZIONE.

A conversazione was held in the Club's Rooms on the evening of 23rd March, 1911. A large number of members as well as several visitors were present.

LECTURETTES, &c.

The President (Mr. H. Tryon), after giving a brief account of the purpose subserved by the Field Naturalists' Club, its organisation, and its procedure, alluded in general terms to the exhibits that had been arranged.

Professor S. B. J. Skertchly gave an address on Stone Implements, dwelling briefly on their outward characteristics in relation to the age of their employment and the nature of their use.

Mr. H. C. Richards, M.Sc., dealt with the subject of Rocks, illustrating the compositions of the different groups by lantern projections of microscopical sections.

Note.—Mr. W. R. Colledge's illustrated lecturette on Pond Life was postponed.

PRESENTATION.

The Club's presentation to the Hon. Secretary and Treasurer, Mr. C. W. Holland, for highly meritorious service, comprising a microtome, a microscope-lamp and an objective, after being exhibited, was received by the President for presentation to him in his unavoidable absence through illness.

EXHIBITS.

ANTHROPOLOGY, &c.

1. By the President.—The original drawing of Petroglyphs occuring at Pigeon Creek, Toowoomba Ranges, brought under notice by him in April, 1884 (*vide* "On an Undescribed Class of Rock Drawings of Aborigines in Queensland." *Proc. Roy. Soc., Qd.*, I., pp. 45—52., Pl. XI—XIII, 1884.)

2. By Professor S. B. J. Skertchly.—A special Ethnological collection comprising :—(*a*) *Modern Series.*—Sets of fire-making implements from different parts of the world, ranging from the old English Tinder-box and appurtances to the extremely rare Dyak Fire-Syringe of which he was the original describer. (*b*) *Prehistoric Series.*—Many interesting American specimens from Mexico, California, Colorado and Canada, including the original Aztec bronze bells (*Yotl*), discovered by Dr. E. B. Taylor and H. Christy. (*c*) *Neolithic Series.*—Rich in East Anglian flints of the exhibitor's finding, and containing also several Swiss Celts from the original discoveries in the 50's. (*d*) *Palæolithic Series*, comprising English and French types of stone implements, some described as being from the original find by M. B. de Perthes, at Abbeville, others as embracing the specimens the exhibitor had formerly discovered in beds (British), that he had proved to be of glacial date. *Note.*—This collection, of more than passing interest and that was said to be "The cream of some 40 years of Work," Professor Skertchly announced, would, with some additions, be deposited in the Queensland Museum.

3. By the Colonial Botanist, Mr. F. M. Bailey, F.L.S., C.M.G., &c.—An ethno-botanical collection of great interest, comprising specimens of vegetable products used in different ways as food, by the Queensland Aborigines. Amongst these were (1) Roots (tubers, rhizomes, &c.) of Nymphæa Brownii, Eriosema chinese, Ipomæa angusti-

folia, Curculigo ensifolia, Typhonium Brownii, Triglochin procera, Heleocharis sphacelata, Scirpus littoralis. (2) Flowers of Eucalyptus corymbosa (Blood-Wood), and of Bauhinia Carronii, sucked for the honey they yield by the Georgina River natives. (3) Pituri exhibits :—a botanical specimen of Duboisia Hopwoodii, the Pituri plant, a netted bag containing Pituri (as prepared by the western blacks), and Gidgee—Acacia homalophylla—yielding the ashes that when chewed with the Pituri cause it to liberate the narcotic stimulant on which its use is dependent. (4) Textile Art :—Armlets, woven by the Papuan natives from the dark coloured rind of the stipes of two large ferns :—Lygodium dichotomum and Gleichenia flagellaris. Dilly bag made from the stems of the sedge—Schænus melanostachyus—by the natives of Moreton Bay ; baskets made from the inner bark of the Bottle Tree—Sterculia rupestris—by those of the Mapoon Mission Station

4. By Mr. G. F. Bennett.—Photographs of noted Naturalists ; a sketch, Sir Richard Owen: and an autograph letter, also of this savant.

ZOOLOGY.

1. By Mr. W. E. Weatherill.—Thirty-two skins of the more beautiful Queensland birds, including Fruit Pigeons Parrots, Kingfishers, Bronze Cuckoos, Pittas, Maluri—Australian " Finches "—Diamond Birds (Pardalotus, spp.), &c., and that of the recently described Queensland denizen—Pseudogerygone cantator, Weatherill (*vide Queensland Naturalist, Vol.* I., p. 74), also skins of Papuan Birds of Paradise.

2. By the President, Mr. H. Tyron.—Examples of the rare Leaf-tail Gecko—Gymnodactylus cornutus—two from the Johnstone River District, and one from the Macpherson Range, one showing a newly substituted tail with altered scale-pattern.

3. By Mr. R. Illidge.—(*a*) A collection (10 drawers) of Australian Lycænidæ, many of the rarer species even being represented by a full series of specimens. (*b*) four cases of foreign beetles, illustrating size, strangeness of form, and special colouration. (*c*) a case, comprising the more beautiful Rhopalocera of the world.

4. By Mr. E. H. Shearwin.—(*a*) The Leaf Butterfly—Melanitis leda—and its variations, illustrated by a case of thirty specimens of the winter form, all taken on one afternoon at the same spot, a flat near Sankey's Scrub (Brisbane District), no two exhibiting identity of colour and pattern beneath. (*b*) about 500 Brisbane moths, obtained in the

Brisbane District, comprising series of the more beautiful Pyralidæ Geometridæ, &c.

5. By Dr. T. P. Lucas, M.R.C.S., Eng., etc.—A special collection of British Lepidoptera.—By way of demonstration of "why and how certain species vary," the exponents of these exhibiting either the action of seasonal or environmental influences, or the results of spontaneous change. This embraced a beautiful series of the British Hair Streaks—Thecla spp., showing especially the close connection between T. pruni and T. w-album; the Vanessas —with interesting illustrations—amongst other features— of the relation between Vanessa cardui and the Australian Painted Lady—V. (Pyrameis) Kershawi; a fine series of the Currant Moth—Abrax grossulariata; exhibiting individual variation in specimens reared in confinement, yet in every generation ones occuring that conformed to the ordinary specific type; an equally interesting set of the Pepper Moth—Amphydasis betularia, showing the influence of season and locality; also a rich series of the beautiful Orange Moth—Angerona prunaria, the variations in which as affecting the general colour, ranged from bright yellow-buff to rich deep-brown, whilst marvellous diversity with respect to both figure and shade of colouration was also manifested by them.

6. By Mr. E. Jarvis.—Studies in water-colour of Queensland Butterflies, including the portrayal of Ornithoptera euphorion, Delias argenthona and D. nigrina. (*b*) Insects showing protective colouration.

BOTANY.

1. By the late Mr. P. MacMahon, Director of Forests. —A polished block of Red Cedar (Cedrela toona) of exceptional beauty.

2. By Mr. C. T. White.—A "cone" of wood of the Grass Tree—Xanthorrhæa arborea. 2.—Representative series of Queensland Sea-Weeds, Mosses, Lichens and Liverworts (Hepaticeæ), mounted and named with, in many cases, drawings explanatory of structural details,

3. By J. F. Bailey, Director of the Botanical Gardens. —Collection of living indigenous plants in pots, including the Bunya (Auracaria Bidwillii), the Hoop Pine (A. cunninghamii); the Tulip Wood (Harpulia pendula); the Narrow and the Broad-leaved Bottle Trees (Sterculia sp.); several "Wattles" (Acacia spp.); Native Tamarind (Digloglottis cunninghamii); Queensland Ebony (Bauhinia Hookeri); and representatives of other trees and shrubs.

4. By Mr. O. O'Brien.—"A Wild Flower Exhibit," comprising about 20 species of plants and amongst them Tetratheca thymifolia, Leucopogon juniperinus, Persoonia spp., Bauhinia spp., Lomatia sialifolia. *Note.*—The Queensland autumn is not conducive to a large display in this department.

GEOLOGY.

1. By Mr. B. Dunstan, F.G.S., &c.—A collection of fossils, among which were the following :—

Graptolites (Hydrozoans) and Lingulocaris (one of the earliest representatives of Mollusca), from the Ordovician Rocks of Victoria. Several well preserved of those interesting early forms of Crustacea—Trilobites (Encrinurus, Calymene Phacops, Hausmannia, &c.), from the Upper Silurian Rocks of N.S. Wales. Corals (Favosites, Heliolites, Cyathophyllum, &c.), from the Upper Silurian Rocks at Chillagoe and Molong, N.S.W. A very interesting Brachiopod (Rhynchonella pleurodon), specially characteristic of the Devonian (Mt. Lambie) Rocks of N.S. Wales. Common forms of Brachiopods (Spirifera, Martiniopsis, Productus, &c.) ; Pelecypoda (Aviculopecten Mœnia, &c.) ; Gasteropoda (Platyschisma and Pleurotomaria) ; Pteropoda (Conularia) ; and of Cephalopods (Goniatites), from the Permo-Carboniferous Rocks, both of Queensland and N.S. Wales. Of Permo-Carboniferous Corals were the well-known forms Trachypora Wilkinsonii, from N.S. Wales, and Stenopora crinita from Gympie. Zaphrentis from near Rockhampton, and the new and interesting Lithostrotion, from Lion Creek, near Stanwell. Fenestella and Rhombopora laxa, from Gympie, were forms of Polyzoa from these rocks. Plants, characteristic of the P. Carb. beds of Eastern Australia, shown were Glossopteris, Gangamopteris, and Vertebraria. From Carboniferous Rocks were Rhacopteris, a beautifully well preserved specimen of the order Filices, and specially characteristic of these beds at Stroud, N.S.W. Large fossil fishes, some of which are still undescribed, from the Wianamatta Shales (Triassic) near Sydney. Casts of vertebræ of a large Saurian (Plesiosaurus), from the Cretaceous Beds, near Lake Eyre, S. Australia. Tertiary Plants from N.S.W.; Fossil Nuts, from the deep leads at Gulgong, N.S.W., and Haddon, Victoria. Marsupials' remains from the Post-Tertiary Beds of Queensland and and N.S.W., including Diprotodon jaws, tusks, and teeth, a large sacrum bone of an extinct Kangaroo (Palorchestes Azael, Owen), from Wellington Caves, N.S.W., which must

have been some fifteen feet in height, and a tooth in the jaw of the Post-Tertiary Carnivore—Thylacoleo.

2. By Mr. H. C. Richards, M.Sc.—(*a*) A series of large glass crystal models, embracing all the simple forms of the six crystalographic systems, displaying clearly the position of the axes. (*b*) a collection of minerals, illustrating peculiar structures and occurences, the more interesting of which were, a specimen of Itacolumite or Flexible Sandstone that bent with ease ; hæmatite in the reniform condition—*i.e.*, affecting a shape similar to that of a kidney ; quartz that had replaced crocidolite and whose polished surface showed rich brown and amber colours, and natural lode-stone to which soft-iron nails clung with great persistency. *Note.*—Some of the specimens embraced in the exhibit were furnished by the Central Technical College collection.

MICROSCOPY.

1. By Mr. W. R. Colledge.—Miscellaneous slides.
2. By Mr. W. M. Tanner.—Miscellaneous slides.
3. By Mr. E. H. Shearwin.—Slides showing, among other specimens, Foraminifera from Moreton Bay, and siliceous sand from the Brisbane River.

MISCELLANEOUS.

By the Club.—Photographs, illustrating features connected with excursion work.

THE

Queensland Naturalist.

THE ORGAN OF THE FIELD NATURALISTS' CLUB
AND ITS BRANCHES

VOL. I. MAY 31, 1912. No. 10.

PROCEEDINGS.

EVENING MEETING, 27th APRIL, 1911.

Chairman : H. Tryon. Attendance, 15.

Obituary : The President referred to the death of the late Philip MacMahon, who was one of the foundation members of the Club, and he spoke in eulogistic terms of the attainments of the deceased gentleman. A vote of sympathy with Mrs. MacMahon in her bereavement was passed.

Members elected : Mrs. A. Howe, Miss M. Rattray and J. F. Moran.

Reports : On Exeursion to One Tree Hill—(*a*) Entomology, by H. Tryon ; (*d*) Pond Life, by W. R. Colledge ; (*c*) Botany, by C. White.

Notes : "On the Dragoon Bird," by R. Illidge (*vide.* Transaetions, p. 221).

Exhibits : By H. Tryon—Insects from One Tree Hill ; a eolleetion of wooden pestles and mortars from New Guinea, used by the natives for pounding the betel nut. By Mrs. T. Pattinson—Inseet galls from One Tree Hill. By E. Jarvis—speeimens, from One Tree Hill, illustrating the life-history of *Eurycu cressida.* By R. Illidge—Dragoon Bird (*Pitta strepitans*) in illustration of paper. By S. B. J. Skertehly—Minute flints made by Ute Indians of Colorado and used to shoot small birds in order to obtain feathers for decorative purposes. By W. R. Colledge—Pupæ of *Euplœa corinna* and *Charaxes sempronius.* By Cyril White—Fungi from the North Coast Line.

EVENING MEETING, 25th MAY, 1911

Chairman : H. Tryon. Attendance, 15.

Members elected : Miss M. Armstrong, H. Hacker and J. H. Parry.

Reports : On Excursion to Buderim Mountain—(*a*) Entomology, by H. Tryon ; (*b*) Botany, by Cyril White.

Mr. Tryon spoke of the recent so-called "shower of shrimps" at Buderim Mountain, specimens of which had been secured by the party, and one, mounted by W. R. Colledge, was displayed for the information of members. He said the animals were not shrimps, but belonged to the Isopoda and to a common terrestrial genus *Talitrus*. He thought there had been no "shower" as had been supposed by local residents, but that in accordance with their usual habit of travelling by night, these Crustaceans were crossing the road where they were found, when they experienced unusual cold, which caused their death.

Notes : On a Geological Trip to Moogerah, near Cunningham's Gap, by R. C. Hamilton (*vide*. Transactions, p. 222).

Exhibits : By H. Tryon — Insects from Buderim Mountain. By Cyril White—Plants from Buderim Mountain. By Dr. Hamlyn Harris, D. Se.—Two Storm Petrels and Eggs ; (*a*) *Pelagodroma marina*, collected on Broughton Island, near Newcastle, which was the most northern limit at which it had been taken ; (*b*) *Œstralata leucoptera*, collected at Cabbage Tree Island, near Broughton Island, the first instance of its capture since Gould's record about fifty years ago. By H. Tryon—A bottle full of a local Ant (*Pheidole omnivora*), received from E. B. Kellaway, who had estimated (by weight) that it contained 983,466 individuals. The exhibitor gave an interesting account of the insect and dwelt upon the significance of its occurrence in Queensland (*vide*. Transactions, p. 224). By Ralph Higgins—Geological Specimens, Aboriginal Implements, etc., from Mt. Wilson. By Mrs. T. Pattinson—Two interesting books ; Albin and Derham's "Natural History of English Insects," published in London in 1735 ; and "Eggs of our British Birds," by Hewitson. By R. C. Hamilton—Geological Specimens in illustration of Notes. By Mrs. T. Pattinson—A Spider from Tambourine Mountain. By H. Tryon—Geological Specimens from near Boonah.

EVENING MEETING, 8th JUNE, 1911.

A special meeting was held on the above date for the display of microscopical specimens. The meeting took the form of a Conversazione, and there was an attendance of forty-five. Much interest was taken by members and

visitors in the various objects shown under the microscope by Dr. Hamlyn Harris (who also exhibited and explained apparatus used in mounting specimens), W. R. Colledge (2), Miss D. Sutton, Miss Culpin, W. M. Tanner, J. Wedd, E. Jarvis and C. W. Holland.

EVENING MEETING, 22nd JUNE, 1911.

Chairman : H. Tryon. Attendance, 14.

Reports : On Excursion to Darra—Entomology, by H. Tryon ; Botany, by C. White ; Geology, by S. B. J. Skertchly ; Pond Life, by W. R. Colledge.

Paper : "Notes on the Song of *Thopha saccata*," by Edmund Jarvis (*vide*. Transactions, p. 229).

Exhibits : By H. Tryon, Insects and galls from Darra. By Cyril White—(*a*) Plants collected at Darra. A specimen of interest was the rare *Stylidium capillare*, R.Br. The leaves of *Limnanthemum indicum*, an aquatic plant common in the Darra Lagoon, were found to be badly infested with the fungus *Æcidium nymphoides*, D.C. In Europe the connection of this *Æcidium* with *Puccinia scirpi* has been shown : only the *Æcidium* stage, however, is known in Australia. (*b*) Specimen of "Job's Tears" (*Coix Lachryma —Jobi*) grown and fruited in Brisbane ; also the *var. Stenocarpa* from Papua, a grass well-known in most tropical countries. The hardy stony brats surrounding the female spikelets are much used in ornamental work ; the grain is eaten in time of famine in India. A copy of Vol. XII. of Rheede's "Hortus Malabaricus," published in 1703, giving an illustration and description of the grass, was shown. (*c*) Photographs of *Eugenia Francisii*, Bail., and *Ficus eugenioides*, F. v. M., both taken by W. D. Francis, of Kin Kin ; (*d*) Specimens of *Xanthium strumarium*—"Noogooia Burr." The exhibitor drew attention to the fact, mentioned by Professor J. C. Arthur, that the two seeds produced by this weed seldom germinate in the same year : if one fails the first year, the plant has a reserve in the second seed, which grows the following year. In the discussion which followed, S. B. J. Skertchly said the fact related had also been brought under his notice by Mrs. Cooper, of Nerang.

EVENING MEETING, 27th JULY, 1911.

Chairman : H. Tryon. Attendance, 20.

Report : On Excursion to Buderim Mountain, by Cyril White.

Exhibits : By Cyril White—Plants from Buderim Mountain ; South African Cucumber (*Cucumis myriocarpus*). By R. Illidge—Butterflies and Moths captured in Brisbane

during June and July. By Miss Sheldon—Nests of Trap-Door Spider. By H. Tryon—Peculiar larval fly (*Microdon*) found in ants' nest near Brisbane, and a photomicrograph of the same taken by W. R. Colledge. By H. Tryon—Limestone from between Biggenden and Degilbo; Calcite from Biggenden; Limestone from the Roma district; and portion of a Dyke in (?) Diorite from Gayndah.

EVENING MEETING, 24 AUGUST, 1911.

Chairman: Prof. S. B. J. Skertchly. Attendance, 19.

Reports: On Excursion to Sunnybank—Pond Life, by W. R. Colledge; Botany, by Cyril White; Geology, by S. B. J. Skertchly; Entomology, by H. Hacker.

Exhibits: By W. R. Colledge—Drawings of Rotifers taken at Sunnybank. By Cyril White—Plants collected at Sunnybank. By R. Illidge—Moths. By T. Burston—Frog, identified by Mr. Tryon, as *Hyla peronii*.

BOTANICAL MEETING, 16th SEPTEMBER, 1911.

Chairman: H. Tryon. Attendance, 42.

This was a special meeting, in the form of a Conversazione, for the display of wild flowers and other botanical specimens.

Prof. S. B. J. Skertchly delivered a Lecturette on the mode of germination of the Noogoora Burr (*Xanthium strumarium*), and displayed specimens of the weed in question in illustration of his remarks.

There was an excellent display of typical wild flowers, such as Boronia, Pultenæa, Dillwynia, Acacia (Wattles), Callistemon (Bottle Brush), Eucalyptus, Epacris (Heath), Grevillea, Hakea, Banksia (Honeysuckle), Telopea (Waratah), etc.

An exhibit of special interest was a collection of growing aquatic plants, contributed by Mr. Cyril White, and a collection of native plants in pots was shown, by permission of Mr. J. F. Bailey, Curator of the Botanical Gardens.

Paintings of Australian native plants by Mrs. R. Garraway, Mrs. S. B. J. Skertchly and Mr. F. C. Wills, were also exhibited, one by Mrs. Garraway depicting the little known *Calostemma scott-sellickiana*.

A large number of dried specimens were shown. These largely illustrated the interesting plants collected at the Club's numerous excursions. In frames were a number of mounted specimens of Cryptogamic plants, Lichens, Fungi, Mosses, etc.

EVENING MEETING, 28th SEPTEMBER, 1911.

Chairman: H. Tryon. Attendance, 8.

Reports: On Excursion to Rosewood—Pond Life, by W. R. Colledge; Geology, by S. B. J. Skertchly.

Exhibits: By Mrs. Pattinson—Shells collected on the Great Barrier Reef and Islands in Torres Straits. By H. Tryon—Thread Fungus (*Marasmius equicrinus*) from Rosewood. By Cyril White—Specimens of the small Grass-tree (*Xanthorrhœa pumilio*); and a root parasite (*Balanophora fungosa*), concerning which Notes were read by the exhibitor.

EVENING MEETING, 26th OCTOBER, 1911.

Chairman: H. Tryon. Attendance, 16.

Members elected: Mrs. and Miss Garraway, Dr. T Harvey Johnston and Mr. E. W. Bick.

Reports: (*a*) On Excursion to Rosewood—Entomology, by H. Tryon: Botany, by Cyril White. (*b*) On Excursion to Goodna.—Entomology, by H. Tryon: Geology, by S. B. J. Skertchly: Botany, by Cyril White.

Exhibits: By H. Tryon.—Insects collected at Rosewood and Goodna. By Cyril White—Plants collected at Rosewood and Goodna. By H. A. Longman—A new Queensland Buttercup (*Ranunculus muricatus*), which he found at Toowoomba about a year since, and which he had again collected in Brisbane recently. By R. Illidge—Foreign Beetles. By H. Tryon—Gordius worm.

EVENING MEETING, 18th NOVEMBER, 1911.

Chairman: H. Tryon. Attendance, 31.

This was the second Microscopical Evening held during the year and it proved to be as successful as the first one held in June. Specimens were shown under the microscope by W. R. Colledge, Dr. John Harris, W. M. Tanner, E. H. Shearwin, C. T. White, H. Tryon and C. W. Holland.

EVENING MEETING, 23rd NOVEMBER, 1911.

Chairman: S. B. J. Skertchly. Attendance, 12.

Members elected: F. Burtt and A. A. Girault.

Reports: On Excursion to Sandgate.—Geology by S. B. J. Skertchly; Pond Life, W. R. Colledge: Botany, Cyril White.

Exhibits: By Cyril White and Miss Forteseue—Plants collected at Sandgate. By R. Illidge—Foreign

Butterflies. By Cyril White—Drawings and specimens of Fungi. By. J. Lamb—Block of wood from Eumundi, showing workings of a beetle (*Cucujidæ*).

EVENING MEETING, 7th DECEMBER, 1911.

Chairman: H. Tryon. Attendance, 16.

Members elected: Dr. John Harris and J. W. Sutton.

Report: On Entomology of Excursion to Sandgate, by H. Tryon.

Exhibits: By H. Tryon—Insects from Sandgate. By R. Illidge—Male and Female Rifle Birds and a Pink Headed Dove. By Cyril White—(*a*) Flowers of Moreton Bay Chestnut (*Castanospermum australe*), and, for comparison, flowers of the variety bevivexillum; (*b*) An example of the Bloodwood (*Eucalyptus corymbosa*) only a few feet high; (*c*) Female cone of *Macrozamia mountperriensis*; (*d*) Photographs of Male and Female Macrozamia. By Mrs. Pattinson—(*a*) Phasma (*Extatosoma tiaratum*); (*b*) Live scorpion (*Hormrus*). By H. Tryon—Bot-Fly of Horse (*Gastrophilus*). By S. Hainsworth—Moths. By C. Holland—Fly (*Rutilidæ*).

EXCURSIONS.

Buderim Mountain, 29th April to 1st May; Darra, 10th June; Oxley, 8th July; Sunnybank, 19th August; Rosewood, September; Goodna, 14th October; Sandgate, 11th November; Queensland Museum, 2nd December.

TRANSACTIONS.

NOTES ON THE DRAGOON BIRD.

(*Pitta strepitans*—Temm.).

Also known as the Noisy Pitta, a member of the Pittidae, or so-called Ant-Thrushes.

By R. Illidge.

This beautiful bird, once not uncommon in the dense scrubs which formerly adorned the immediate vicinity of Brisbane, and probably still existent in the Enoggera and Gold Creek scrubs, is the sole representative of both family and genus occurring in South Queensland. There are two others—Macklot's Pitta, ranging from North Queensland into New Guinea, and the Rainbow Pitta, in Cape York Peninsula, both extremely beautiful birds. There is also a small form or sub-species of the Noisy Pitta, known as the Allied Pitta, in the scrubs of North Queensland.

The Dragoon Bird is solitary in its habits, and it is rare to see more than two, and that only during the pairing season. It lives almost exclusively on the ground, sometimes hopping on to logs and low branches, and usually keeping well under cover, so that to be able to watch the bird it is necessary to sit very quiet in some retired part of the scrub which they are known to haunt, and which their peculiar call readily betrays. I have also found them by the noise they made when breaking snail shells on stones and logs, the snails forming a portion of their food, together with grubs of various kinds and all sorts of ground insects, millipedes and the like, but I certainly never found ants to be part of the menu. Of its nidification I cannot speak with certainty, not having been able to see the nest in occupation, but a large domed structure, higher and larger than that of the Spine-tailed Orthonyx, was once pointed out to me as its nest, and I occasionally came across other deserted ones all covered with moss which usually decorates the nests of scrub birds. These nests were all built on the ground, usually against or upon a bank and very difficult to detect. The eggs, of course, I never saw. I know of no special reason for calling it Noisy Pitta; its call can be heard in the stillness of the scrub for a long distance—so can the calls of most other birds.

NOTES ON A GEOLOGICAL TRIP TO MOOGERAH, NEAR CUNNINGHAM'S GAP.*

By Robt. C. Hamilton.

During the Technical College vacation week, a small party, organized by and under the leadership of Mr. R. A. Wearne, B.A., Principal of the Ipswich Technical College, paid a visit to the district south-east of Cunningham's Gap.

We assembled at Ipswich and took train to Munbilla, Thence we journeyed by coach, *via* Engelsburg, to the Moogerah State School. On the way a visit was made to the school hill at Engelsburg and there the ground was found to be strewn with fossil wood. Some fine specimens, containing veins of chalcedony and semi-opal, were obtained.

By permission of the Education Department the Moogerah School was made our headquarters. It may be interesting to mention that the aboriginal name of the locality is Moogerahba, and not the present curtailed form. The school is situated near Mt. Alford, which with Mt. Moon forms an isolated ridge east of the Main Range.

Our first visit was to Glennie's Pulpit, a solid plug of rhyolite standing out prominently on the side of Mt. Alford. Along the road to the south of the Pulpit we found trachyteand rhyolite. The trachyte intrudes the Walloon Coal Measures—the upper series of the Ipswich formation. The rhyolite is identical in appearance with that of Glennie's Pulpit—quartz blebs and sanidine crystals in a beautifully white compact matrix—and it is apparently a flow from that centre, overlying the trachyte. The ascent to the Pulpit proved arduous. In order to avoid the denser parts of the scrub that clothes the base and sides of the mountain, we were forced to make a lengthy detour. The undergrowth was very prickly and some of the party suffered severely. Half way up, a rocky bluff of rhyolite was reached, and near it the grits of the Walloon Measures again outcropped. Some conglomerate also was present containing interesting pebbles of trachyte.

Several scrub-turkeys' nests were next passed, and after another stiff climb the Pulpit was reached. The rhyolite plug towers about 120 feet high, with vertical walls. It is about 100 yards long by 50 yards wide. Horizontal prismatic structure is very distinct, and on one side is a large cleft.

*Cunningham's Gap, in the Great Dividing Range, is about 54 miles South West, of Brisbane.

Our next trip was to Mt. Greville. This peak stands in solitary grandeur opposite Mr. Alford, and is about 2,700 feet high. It was found to be composed of grorudite—a quartz variety of trachyte containing riebeckite hornblende. A magnificent gorge runs three-quarters of the way up the mountain and affords a fairly easy ascent. This gorge is over half a mile in length, and in places is only 10 yards wide. The walls rise vertically from 100 to 200 feet in height. In places, the rocky walls are covered with staghorns, elk-horns and bird-nest ferns. The gorge has apparently resulted from the decomposition of some former basic dyke. Across it run several smaller clefts.

On emerging from the gorge, the usual forest vegetation was met with, and from a rocky spur, a magnificent panoramic view of the surrounding country was obtained. In front stand Mt. Moon and Mt. Alford with Glennie's Pulpit, and in the distance, behind these, are the lofty peaks of the Macpherson Range. The lonely Mt. Barney (4,650 feet)—the heighest peak in the neighbourhood—is also very prominent. In the foreground, Reynolds' Creek meanders down the valley, whilst on the right is the Main Range. One can not help noticing how the peaks of this range rise to almost similar heights. We have Mt. Cordeaux (4,100 feet), Mt. Mitchell (4,100 feet), Spicer's Peak (4,050 feet), Mt. Huntley (4,150 feet) and Mt. Roberts, (4,350 feet). Between the first two mountains is Cunningham's Gap, through which a bridle track runs. The Warwick road passes up through Spicer's Gap, which is situated between Mt. Mitchell and Spicer's Peak. All these peaks, as Dr. Woolnough explained when we first saw them, are probably the remnants of a denuded pene-plain which once stretched continuously over the present Fassifern Valley and the Darling Downs. Mature streams had cut their U-shaped valleys through it, but a large fault took place along the line of our present Main Range and the eastern side was let down. The heads of the streams that formerly flowed west, were thus cut off, and their old valleys form the present "air-gaps" which are known to us as Cunningham's Gap, and Spicer's Gap.

Mt. Greville affords a splendid station for studying the physiography of the surrounding country, and for this reason, as well as for its beautiful palm gorge, ought to be reserved by the Government as a national park.

We next visited Mt. Edwards. This is another detached mountain, or rather twin mountain, for it consists of two peaks with a large V-shaped valley between them. The creek runs through the valley to the north, but at first sight from the general appearance of the gorge, one feels convinced that the stream is running in the opposite direction. As Mr. Wearne pointed out, this is probably

an example of a "captured" tributary of one of the former western flowing streams. Mt. Edwards consists of trachyte, and several specimens showing beautifully banded weathering were obtained.

We then proceeded towards Stenzel's farm, and just before reaching it, we came upon a fine example of a mottled trachyte dyke with pitch stone on its edge. This was black in colour and spherulitic in structure. It was the first occasion during our trip that we had found pitch stone in situ, though we afterwards found it again, this time of a dark green colour, near the Moogerah School. At Stenzel's farm we also met with a dyke of banded rhyolite intruding the Walloon conglomerates and grits.

Towards the end of our stay, we paid a visit to the bed of Reynolds Creek in order to add to our collection of specimens. The following rocks were obtained:—aplite, grorudite, solvsbergite, amygdaloidal trachyte containing sodalite and phacolite, chalcedony, dacite, quartz diabase, olivine basalt and some fine breccias. A large boulder showing the junction of aplite and andesite was also found.

We travelled back to Engelsburg by a different route, and on the road side, near Mt. French, specimens of comendite were procured. This rock is very similar to grorudite, but the free quartz present is only visible under the microscope. The Mt. French comendite has been analysed and has been found to be very acidic in composition. It contains about 72 per cent. of silica, whilst a normal trachyte contains only 62 per cent.

The fact that our trip was so successful was entirely due to the unselfish and untiring labours of Mr. Wearne, who carefully planned the arrangements for each days' work. Through his efforts attention has been drawn to a district exceedingly interesting from a geological point of view, and one which is well worthy of an extended visit by our Field Naturalist Club.

THE NATURALIZATION OF AN EXOTIC ANT (*PHEIDOLE MEGACEPHALA, Fab.*)

By *Henry Tryon.*

The Ants exhibited, in such numbers, are examples of a species named *Pheidole megacephala*, (Fabr.).

The name "Pheidole" signifies economically laborious, and was bestowed in 1841 on one of this group of ants by Westwood (2) to commemorate the fact that it is most indefatigable in its special habit of storing garnered seeds.

It will be remembered in this connection, that the exhibitor himself formerly described a Queensland Pheidole

Ant, that was an harvesting species also (c.f. Proc. Roy. Soc. Qd. II. 1885 and Qd. Ag. Journal, VII., p. 71, 1900).

The term "megacephala" (*Gr.* large head) was bestowed on the insect before us by Fabricius (1), in allusion to the enormously large head possessed by one class of individuals composing the ant-community—*viz.*: the "Workers Major or Soldiers." It is, however, a character that is not peculiar to this ant; all other kinds of *Pheidole* presenting us with some large headed individuals.

The genus *Pheidole*—that they represent—is a very large one, especially prevalent in tropical and sub-tropical countries; and it has many species in Australia, and in Queensland especially.

Notwithstanding: *Pheidole megacephala* is not a native of Australia, but an exotic insect, that, having been introduced here, has become naturalized.

There is some uncertainty regarding its original home, but the earliest notices of it describe it as occurring in Mauritius (Fabricius), and Madeira (Heer).

With regard to the latter site, the German naturalist Heer (3), writing in 1862 already ascribes to it troublesome domestic habits; as is implied in the title of his paper; in which he gives account of it, and in the new name with which he designates its subject:—*Œcophthora pusilla*—"Uber die Hausameise Madeira's."

We soon again learn that it is an ant that lends itself to wide distribution. For during the year that preceded the date of Professor Heer's brochure, the Rev. W. Farren White (8) found it in numbers in a particular tenement at Exeter (England), and it still continued to be prevalent there in 1877.

Again, Dr. G. Mayr (6), in describing the Ants, in the account of the Zoology of the "Novara Expedition," stated that *Pheidole megacephala* (Fabr.) was a species that it was very necessary to know about, since it was one that was quickly spreading over all parts of the earth. He also pointed out that the Ceylon ant, named in 1862 by Motschulsky (5)—*Œcophthora ceylonica*, was identical with the one now under consideration. In 1883, E. Andre (7) speaks of it as occurring, not only in South Africa, Algeria and Turkestan, but in "touts les regions tropicales et subtropicales due monde entier." More recently, *i.e.*, in 1887, Prof. C. Emery (9) has intimated that in the collections of the "Museo Civico" of Genoa, are specimens from Amboyna Celebes, New Guinea, Andai and Ramoi; thus confirming part of Mayr's statement. Writers again have described it as being naturalised in the Hawaian Islands.

The habits of ants belonging to the genus *Pheidole*, are conducive to their dissemination through commerce in living plants. Thus Dr. A. Forel (10), writing in 1901,

on *Formicidæ* that had been met with on exotic plants on their arrival at Hamburgh, mentions no less than four species of the genus.

In August, 1901, it was already well established in the Cairns District of N.E. Queensland. In fact, preying on the scarabæid larvæ—known there as "Cane Grubs" in our breeding boxes, these destructive insects could not be maintained alive under these circumstances without much difficulty. Albert Koebele, in conversation, noted, too, their occurrence there in immense numbers shortly afterwards, referring to them under the term *Pheidole omnivora*—that we, too, have sometimes bestowed upon them, thus confusing it with a smaller ant having this specific name, belonging to the genus *Monomorium*. In a "Catalogue of the Described Formicidæ of Australia," compiled by W. B. Gurney (11) in 1905, we again find *P. megacephala* mentioned as an ant occurring at Cairns.

During the last few years the same ant has become established in the Brisbane district; and, for some time past, it has been exceedingly numerous in certain areas of South Brisbane, being met with in these, beneath every stone or piece of wood lying on the ground and pervading the soil generally in its extensive tunnelling, both colonies and individuals being excessively plentiful. It has also gained some notoriety as a domestic species, giving especial attention to the kitchen, pantry and larder. Being present in millions, where it occurs; being carnivorous to a large extent; and with predatory habits also; its occurrence has had an important bearing on the manifestation of other insect life.

Scarcely any other insect can exist where it has become well established; a remark that applies not only to the soil-frequenting kind, but to a less extent indeed to those that live on or in bushes and trees. Some may become prevalent for awhile, but these ants apparently soon get the upper hand of them. We have, in two instances, seen small wood-boring beetles torn to pieces by them whilst engaged in laying their eggs—the one in fig, the other in Eucalyptus wood. It would seem, indeed, that the dearth of insect life generally in Brisbane—the local entomologist's complaint—is largely to be attributed to their voracious hordes. Most remarkable is the fact that other kinds of ants vanish before them. They will quite exterminate the large communities of the "meat-ants"—*Iridomyrmex* and of *Lasius*, sp. as well as of Formicidæ, belonging to the genera *Campanotus*, *Polyrachis*, *Leptothorax*, *Cremastogaster*, *Monomorium*, &c. Even the "Green Head Ant," *Ectatomma metallicum*, that stings with such virulence forms no exception in this respect. In fact, on a given area under observation, ants belonging to all these species have

disappeared entirely In fact, only a diminutive black ant, one less in size than are they, can live where they are present. This is a wood-frequenting insect. Apparently dog-, cat- and other fleas even have received their attention, doubtless being assailed when existing as "grubs" in the soil or on floors. Formerly it was considered that they would play an important part in destroying "cane grubs," the larvæ of large scarabaeid beetles, in our plantations; but finding the two living side by side, this expectation has had, in great measure, to be abandoned.

But notwithstanding this habit, the exercise of which occasions such destruction to other insects, it is displayed with noteworthy limitations. There is a certain class of insects, the members of which not only enjoy immunity from their attacks, but are protected by them from other would-be enemies, moreover, *Pheidole megacephala* even tends and cares for them. Unfortunately, these embrace some of the worse foes of vegetation, including the Scale Insects and the Mealy Bugs, the Aphides and the Plant-Hoppers. These latter yield the Ants sweet excretions, that they are very partial to, and on which apparently they can subsist. Plants often owe their infestation by these sucking insects to the ant now under consideration.

In the dwelling they are wont to infest meat-viands especially, and by reason of their small size and large numbers, the housewife is often at her wits end in devising measures to exclude them.

It is fortunate that apparently their permanent establishment in any one place is determined by prevailing meteorological conditions. In the Brisbane District it is to be observed that at certain times the surface of the soil that they frequent has distributed over it little heaps of brown particles, suggestive of coffee "grounds." These heaps are, on closer inspection, found to consist entirely of dead Pheidoles that having died in their nests are carried out for hygienic purposes. Not only does this occurrence indicate the density with which the area occupied is peopled by the ant-communities, and the immense number of individuals that these comprise; but it is also suggests to how large an extent they fortunately may be controlled by nature alone, and that their ultimate range of occurrence is dependent on climatic factors.*

E. B. Kellaway, to whom we are indebted for this exhibit, and whose observations confirm in the main what has been above stated, has suggested that these heaps of dead ants are evidence that *Pheidole megacephala* is habitually a canni-

*The exhibit, comprising 983,466 ants—a number computed by weighing—was procured by E. B. Kellaway from a few of the heaps of dead individuals.

bal towards its own species, as well as an unremitting foe of other insects ; but this is a view that need not be entertained.

When one recognises, that a case of living plants, especially when soil be present, pot-plants, a box of "entomological specimens," &c., will support for a while a colony of this troublesome emmet, or that it will temporarily establish itself in one's lunch-bag, its wide diffusion is readily accounted for.

REFERENCES.

*Not verified.

(1) 1793. Fabricius. "Entomologica systematica emendata," p. 361, 1792-6, Hafniæ (*Formica megacephala* :—Thorace postice bispinoso ferrugineo, abdomine nigro, capite maximo. *Habitat,* Isle de France—Mus. Dom. Bosc).

(2) 1841. *Westwood* (J.O.) Annals and Magazine of Natural History, VII, p. 87 (Gen. Char., *Pheidole.*)

(3) 1852. *Heer* (O.) "Ueber die Hausameise Madeira's"—Zurcher'sche Jugend auf das Jahr, 1852, von der Naturforsechenden Gesellschaft, LIV., Stuck *Œcophthora pusila,* Heer. Description (with plate) of Female, Male, Worker and Soldier, with full account of habits and as observed at Madeira.)

(4) 1856. *ib.* "On the House Ant of Madeira." Annals and Magazine of Natural History. Ser. 2, XVII., pp. 209-24 and 322-33. Pl. III. (Translation by R. T. Lowe of (3).)

(5) 1863. **Motschulsky* (V. von). Bulletin de Moscou. (*Œcophthora ceylonica,* M.)

(6) 1864-5. *Mayr* (Dr. G. L.) "Formicidæ." Novara Expedition, Zoologischer Theil, Abth. I., p. 93. (*Pheidole megacephala,* F.)

(7) 1883. *Andre* (E.) "Species des Hymenopteres d' Europe," II. p. 383-4.

(8) *n.d. White,* (Rev. W. Farren.) "Ants and their ways," p. 51-70, London (*Pheidole lævigata,* White, *nec* Mayr.‡

(9) 1887. *Emery* (C.) "Catalogo delle Formiche. . . del Museo Civico di Genova." Ann. del. Mus. Civ. Gen., Ser., 2, V., p. 461. (*Pheidole megacephala,* Fabr.)

(10) 1901. *Forel* (Dr. A.) "Ameisen die mit exotischen Pflanzen nach der Station fur Pflanzenschutz in Hamburg." Mitt. a.d. Natur historisch Mus. XVIII., p. 78-9. Hamburg.

‡Dr. G. L. Mayr, in characterising *P. lvœigata,* Mayr indicates Brazil as the source of the type example *vide,* "Myrmecologische Studien," erhandt der k. k. Zool. bot. Gesellsch. 1862, p. 747.

(11) 1905. *Gurney* (W. B.) "Catalogue of the described 'Formicidæ' of Australasia." Appendix "Domestic Insects- Ants" (by W. W. Froggatt.) Misc. Pub. Agr. N. S. Wales, Sept. 1905. *Pheidole megacephala*, F.)

Note :—(*a*) *Latreille*, appears to have transferred the species from *Formica* to *Myrmica*, and F. Smith subsequently pointed out that Heer's *Œcophthora* was identical with Westwood's prior- defined *Pheidole* (*vid.* Catal. Hym. B.M., VI., p. 173, 1858.)

(*b*) *Losana*, writing in 1834 on the indigenous ants of Piedmont ("Memoire della Reale Accademia delle Scienze di Terino. T XXXVII") has on page 328 described a *Myrmica megacephala*. A perusal of the German translation by Mayr suggests that it is distinct from the Fabrician species. A view also taken by Professor Heer.

[For a fuller biography, embracing 32 titles, reference may be made to Dr. C. G. De Dalla Torre's "Catalogus Hymenopterorum," vol. vii., p. 9, 1896.

NOTES ON THE SONG OF *THOPHA SACCATA*.

By Edmund Jarvis.

Introductory Remarks.

The familiar cry of this fine cicada compels attention from even the most thoughtless, for one cannot help noticing a noise that at times is loud enough to interfere with ordinary conversation. On more than one occasion, whilst in Victoria, I have listened to *Cyclochila australasiæ*, an allied species, in full chorus, and would not like to have missed the experience, but judging from the noise made by a single individual of T. *saccata* should imagine that the choral efforts of this species would be still more impressive, and entirely eclipse those of any of our southern forms, Some of the cicadas of other countries are said to be as noisy as our own. Kirby and Spence*—commenting on Captain Hancock's statement that Brazilian cicadae sing so loudly as to be heard at the distance of a mile, remark :—"This is as if a man of ordinary stature, supposing his powers of voice increased in the ratio of his size, could be heard all over the world." Virgil is said to have accused those of Italy of "bursting the very shrubs with their noise;" and, judging from the following brief extract from one of Ruskin's letters, Italian cicadas are still sufficiently assertive to prove a source of annoyance. He writes :—"I think I should so like to be deaf, mostly, not expected to answer

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* Intro. to Entom., Vol. 2, p. 403.

anybody in society, never startled by a bang, never tortured by a railroad whistle, never hearing the nasty cicadas in Italy, nor a child cry, nor an owl."

The specimens of *Thopha saccata* exhibited this evening render a technical description of the species unnecessary, but I have pleasure in referring members to an article by Mr. W. W. Froggatt, entitled —"Cicadas ('Locusts') and their Habits": (Ag. Gaz., N.S.W., 1903, p. 334) which throws considerable light upon the life-history of some of our large typical forms; and to a valuable monograph of the Australian Cicididae (Pro. Linn. Soc., N.S.W., 1904) in which he and Dr. Goding have described 120 species.

Attempts to describe strident screaching notes such as those characteristic of many of these insects, are generally more or less unsatisfactory, and it seems to me that when possible a verbal description could with advantage be supplemented by a record of the position such sounds would occupy in a stave of music; as by this means their altitude, and the intervals between them could be correctly registered. Before mentioning the result of what may be termed an analytical investigation of the song of *saccata*, it will be advisable to consider for a moment the nature of the mechanism by which it is produced. Mr. Froggatt, in his article already alluded to, tells us that—"The male has a large plate on either side of the under surface of the body attached to the corselet, but extending over the basal portion of the abdomen, beneath which is a cavity formed into two cells, occupied by two small, thin, glass-like plates, which Reaumur called mirrors; above these are bundles of muscles, which lead to two membranes formed like kettle-drums, each of which has a convex and concave part, the first of which is folded and full of ridges." Haswell describes the action thus—"The loud shrill note emitted by the insect is the result of a quick succession of crackling sounds produced by the movement of the stiff membrane with its horny ribs, through the agency of the muscle. Under ordinary circumstances, the sounds follow one another with sufficient quickness to produce a continuous note, and this is effected not by the contraction of the muscle as a whole, but by the successive contraction of individual fascieuli (different filaments forming the whole), all of which act on the horny plate, and thus the movements of the muscle on the tendon during the production of the note resemble those of the hammer-board of a piano when a number of keys are being struck in quick succession."

SONG OF *Thopha saccata*.

The usual song of this species on a hot day, when heard at its maximum altitude, *viz.*: full cry, is pitched either

* Hortus Inclusus' miscellaneous letters, p. 132.

on the note A natural (five notes above the middle C at concert pitch), or on B flat (half a tone higher).

Having tested with a tuning-fork the songs of a number of specimens, and found that the full-cry did not in a single instance range above or below these notes, but was generally pitched exactly on the A natural or B flat, and, moreover, noticed that the majority of captured specimens consist either of large or decidedly smaller individuals, I am inclined to think that the males possibly constitute two classes, separated by a comparatively small group containing medium sized insects.

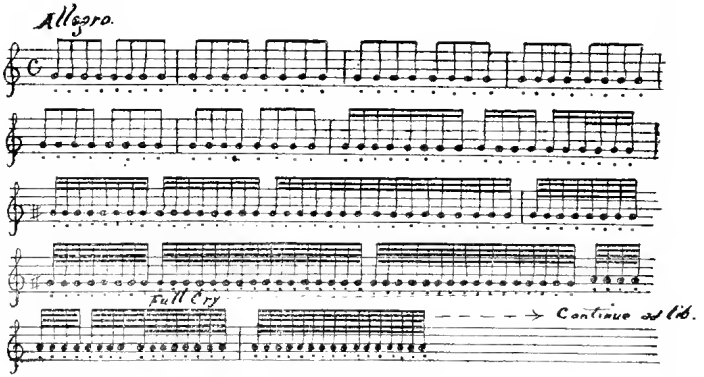
The variation of a semitone between the full-cries of different males, is, therefore, very likely due to this inequality of size, and, assuming the lowest degree of tension of the drum-like membranes to be equal in all, the sound-organs of large forms, being proportionately wider in diameter, would naturally emit a deeper note than that produced by the same number of vibrations acting upon those of smaller specimens.

The song begins on a lower pitch than that ultimately reached by the insect when in full-cry, so it seems reasonable to suppose that in addition to its ability to vibrate the membranes of the sound organs, it is also able to slightly stretch, or to relax them.

Taking the larger male, for example, we find that it commences to sing on G natural (a tone below its maximum height) and repeats this note at intervals which in musical notation would be represented by a series of quavers occupying from four to six bars of common time, and played at Allegro. In bars seven and eight (see illustration) these quavers are followed by semiquavers and demisemiquavers and before the termination of the ninth bar by semidemi-semiquavers and finally hemisemidemisemiquavers, the increase in rapidity being accompanied by a gradual rise of one tone, from the beginning of the seventh to the end of the ninth bar. The nine opening bars, which form a kind of short prelude to the cry, take about fifteen or twenty seconds to perform, and usually precede the first song of the day, or may be heard during the glimpses of sunshine in dull weather, when passing clouds have caused the insect to remian silent for a longer period than usual; but on hot, sunny days, after a very short interval of silence, it will often omit the prelude and suddenly start again at full speed on its top note.

The various sounds and intervals composing the well-known song of this cicada are represented by the combination of notes in the following staves, but of course no attempt is made to illustrate the vibrations that give rise to them. To produce A natural for instance, the insect has to cause its drums to vibrate about 430 times per second, and

although possibly unable to reduce or increase the rate of these vibrations, is able, as shown below, to so regulate their number as to make notes of different lengths.



If it were possible to strike a succession of A natural hemisemidemisemiquavers on the key-board of a piano at Allegro time. the effect would be a continuous vibratory sound: which, whilst corresponding to the altitude of the insect's full-cry would however necessarily lack its resonant ringing quality of tone.

It is more than probable that in addition to its usual song or call it has other notes, perhaps used when in company with the female. Bennet says, it cries:—awo'ck, awo'ck, awo'ck—" uttered three times in rapid succession like the note of a bird."

The duration of its call song is naturally influenced by varying conditions not always easily determinable, but under favourable circumstances is sustained for at least five minutes, and ceases either abruptly, or by quickly dropping for a few seconds to the lower quaver notes with which it started.

It would be interesting to follow up this subject with a view of obtaining more complete information, but to do so seems almost like wasting time when one recollects the vastness of our field for scientific research, and that the transformations of many common species of butterflies and moths, etc., are still undescribed.

NOTES ON THE GEOLOGY OF ROSEWOOD.

By Sydney B. J. Skertchly.

The main geological features of the Rosewood district are as charmingly simple as they are interesting. But you must look down upon Rosewood before you can look up to it, and it is built or stuck upon a flat of such tenacious clay, yet of such lubricating potentiality, that in wet weather (such as favoured us part of the time) you either adhere

to the flats or slip off the slopes. Yet up those slopes you needs must climb would you see fair Rosewood right. Then from the heights, you notice that the country is a basin, not flat-bottomed, but crinkled into tortuous ridges so that the new railway line to Marburg looks as if traced upon the gyrations of a puppy chasing its tail. Away upon the horizon rises the beautifully-fretted rim of the basin—the old palæozoic and crystalline rocks which form the double rampart of the ranges. The rocky infilling of the basin is of Trias-Jura age, the so-called Ipswich Series, a mass of sandstones, clays, and shales with, in this locality, at least two good coal-seams. All these beds are of fresh-water origin, the silted up relics of vast lagoons. They have been gnawed and battered by the weather of ages into the knots and spurs which give beauty to the landscape, and in late Tertiary times the greater part was drowned in the limpid floods of molten basalt, which, in its turn, has become the victim of the everlasting war of the elements. Hence the basalt, for the most part, caps the ridges, often as bluffs, and adds much to the picturesqueness of the scene.

Thus, if we go northwards from the railway station towards Tallegalla, we pass over nearly horizontal shaly and loamy beds, in which rounded masses of segregated sandstones and ironstone occur in broken lines. At the Glencoe Colliery we can penetrate by the sloping adit a hundred feet below ground, intersecting two good beds of coal, each over five feet in thickness. Coming to grass and continuing our route the land rises more steeply: we are on harder beds of sandstone with much ironstone; finally we reach the basalt, and may tarry to gather limpid crystals of chabazite encrusting the black igneous rock, and lining its cavities.

Away to the south the land is all low, the alluvium of the Bremer River, but I more than suspect the tough ruddy and black clays belong to what I have provisionally dubbed the Brisbane Tertiaries.

The whole area was, 20 years agone, covered with dense scrub, patches of which, delightful dryad haunts, still happily exist. This scrub is the parent of the rich soil that has made this district famous for its dairy produce. But if the relics of the scrub be not preserved, ichabod will have to be written upon the land. Already, owing to the abstraction of moisture, the soil has settled down; you can measure 9 inches of settlement at the schoolhouse. Already the rainfall has diminished by nearly a half, as the original settlers assure me. Already the storm clouds fail to halt upon the ridges as of yore, and speed them over the hills and far away. Nature is very bountiful, but even her gifts are exhaustible; she only asks her poor relic of scrub be saved to her upon the crests of the hills; if this be not vouchsafed—well, even her hand will be stayed.

The water courses are not permanent streams ; farmers have to dam the channels to pond up reserves for the stock. But water can everywhere be got at moderate depth—but, alas, it is too oft the water of Marah, bitter. Why this is, indeed almost the whole story of Rosewood must, like the tale of Cambuscan bold, be for want of space, left untold.

DONATIONS TO THE LIBRARY.

The following donations to the library have been received since the last issue :—From Field Nat. Club, Victoria —*Victorian Naturalist* April/Dec. From N.S.W. Nat. Club —*Australian Naturalist*, Vol. II., Parts 4/8. From the Editor —*Knowledge*, March/December. From the Editor— *Country-Side Monthly*, April/Dec. From Field Nat. Club, Geelong—*Geelong Naturalist*, March and October. From Nat. History and Science Soc. of Western Australia—Journal Vol. III., Nos. 1 and 2. From Selborne Society—*Selborne Magazine*, March/May, July/Dec. From American Museum of Nat. History—Journal, Feb./Dec. From Wilson Ornithological Club—Wilson Bulletin, No. 23, Nos. 1/4. From Royal Society of Queensland—Proceedings, Vol. XXIII., Part I. From Field Nat. Club, Tasmania—*Tasmanian Naturalist*, Vol. 2, No. 4 ; Report of Easter Camp-out. From Government Botanist, Melbourne—Miscellaneous reprints ; Bitter Pit in Apples, by Jean White. From Technological Museum, Sydney—A Research on the Pines of Australia, and A Research on the Eucalypts, by R. T. Baker and H. G. Smith ; Wattles and Wattle Barks ; Raw Wools, Descriptive Catalogues 2 and 3 ; Illustrations of Types of Wool ; Bibliography of Australian Economic Botany ; Wool-sorting, etc. ; Gems and Precious Stones ; Report on a Beetle destroying boots and shoes ; Guide to Technological Museum ; Annual Reports, 1907/1909 ; Building and Ornamental Stones of N.S.W., by R. T Baker. From J. G. Hay —Visit of Charles Fraser to the Swan River in 1827. From A. J. Moore (Hull, Eng.)—*Journal of Natural Science*, Vol.1, No. 1. From Cyril White—On some new Fishes from the Queensland Coast, by J. D. Ogilby. From Geological Survey, Brisbane—Report on The Oaks and Eastern Portion of the Etheridge Goldfiield ; Sketch Map of Croydon and Etheridge Goldfields ; Map of Cape York Peninsula Gold and Mineral Fields ; Records, No. 3 ; The Burketown Mineral Field ; Sketch Map of Goldfield in vicinity of Charters Towers. From Director Queensland Museum— Annals, No. 10. From Amateur Fisherman's Assoc.— Annual Report, 1910/11. From Government Botanist, Sydney—A Critical Revision of the Genus Eucalyptus, Vol. II., Part 3. From Government Entomologist, Sydney —Miscellaneous reprints.

The

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The Organ of the Field Naturalists' Club and its Branches.

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PROCEEDINGS.

ANNUAL MEETING, 25th JANUARY, 1912.

Chairman : H. Tryon. Attendance 27.

Members elected : S. Ainsworth, Mrs. F. H. Hobler.

Annual Report : The report of the Committee for 1911 was read and adopted.

Presidential Address : The retiring President delivered an address on " Biology—The Science of Living Things " (*vide* Transactions p 241.).

Office-Bearers : The election of office-bearers for 1912 resulted as follows : *President,* R. Hulsen ; *Vice-President,* Dr. R. Hamlyn-Harris ; *Committee,* Mrs. T. Pattinson, Miss E. Barker, W. R. Colledge, H. Hacker, S. B. J. Skertchly and W. M. Tanner ; *Hon. Secretary,* C. W. Holland ; *Hon. Excursion Secretary,* C. T. White.

In February Dr. R. Hamlyn-Harris resigned, and his position was taken by H. A. Longman.

EVENING MEETING, 29th FEBRUARY, 1912.

Chairman : R. Hulsen.

Mr. Longman referred to the approaching birthday of Mr. F. M. Bailey, and moved, " That this club offers hearty congratulations to Mr. F. Manson Bailey, C.M.G., Government Botanist, on the attainment of his 85th birthday."

Reports : On excursion to Nundah—(a) Pond-life by W. R. Colledge ; (b) Entomology by Messrs. Hacker and Tryon ; (c) Botany by C. T. White.

Paper : " Botanical Gleanings from the Macpherson Range," by C. T. White. The author gave a popular account of the plants met with on a visit to some of the higher parts of the Macpherson Range, in company with Mr. H. Tryon

and Mr. R. W. Lahey. A detailed list of the plants met with on that occasion at altitudes of 2,000 feet and over will be found recorded in the *Queensland Agricultural Journal*, XXVIII. (1912), 195.

Exhibits : By W. R. Colledge—8 specimens of rotifers taken at Nundah (Kedron Brook). By C. T. White—Plants from Nundah and Macpherson Range. By H. A. Longman —two frogs *Adelotis brevis*, Gthr, and *Hyella bicolor*, Gray.

EVENING MEETING, 28th MARCH, 1912.

Chairman : R. Hulsen.

Member elected : W. R. Easton.

Reports : On excursion to Enoggera—(a) Entomology, by H. Hacker ; (b) Botany, by C. T. White.

Exhibits : By H. Hacker—Insects from Enoggera. By C. T. White—Plants collected at Enoggera. By R. Higgins —Various natural history specimens, stone spear head, fossilised wood, embryo wallaby, geological and entomological specimens, all obtained near the Georgina River. By Dr. F. Hamilton Kenny—Specimens of Dracophyllum Sayeri, an epacrid from the summit of Bellenden Ker and a representative of the Antarctic element in our flora ; fruits of Pisonia Brunoniana, which by their viscid nature are no doubt the cause of the deaths of a large number of birds annually ; and 22 specimens of flowering exotic shrubs from a suburban garden.

EVENING MEETING, 25th APRIL, 1912.

Chairman : R. Hulsen.

Members elected : Miss Elsie B. Ham, Dr. F. Hamilton Kenny and J. Carrick.

Reports : On excursion to Buderim Mt.—(a) Pond-life, by W. R. Colledge ; (b) Entomology, by H. Hacker ; (c) Botany, by C. T. White.

Exhibits : By H. Hacker—Insects from Buderim Mt. By C. T. White—Plants from Buderim Mt. By H. A. Longman—A frog *Hyla Freycineti* from Buderim Mt. ; a live snake-lizard *Lialis burtonii* and another specimen (29in. in length) in formalin ; dried specimens of *Cassia occidentalis*, a weed he had found naturalised in the Brisbane district. By Miss E. Ham—Shells from Mooloolah Hds. (Buderim Mt. Excurs.) By S. Ainsworth—A few rare shells from Somaliland.

EVENING MEETING, 16th MAY, 1912.

A special meeting was held on the above date for the display of microscopical specimens. The meeting took the

form of a conversazione, and there was an attendance of 25 members. Dr. T. Harvey Johnston delivered a lecturette on Polyps, illustrating his remarks by slides shown under four microscopes. Specimens were shown by Mrs. J. Pattinson, W. R. Colledge, E. M. Shearwin, C. W. Holland. W. M. Tanner, H. A. Longman, F. Considine and C. T. White, A special entomologist's microscope was exhibited by H. Hacker.

EVENING MEETING, 23rd MAY, 1912.

Chairman : H. A. Longman.

Members elected : Miss Adderley, C. Alvey.

Reports : On excursion to Ithaca Ck.—(a) Pond-life, by C. W. Holland; (b) Entomology, by Messrs. Tryon and Hacker; (c) Botany, by C. T. White.

Exhibits : By Messrs. Holland, Tryon, Hacker and White —specimens from Ithaca Ck. By E. Jarvis—Specimens of the different hawk moths found on the grape vine, one of which—*Sphinx convolvuli*—is also a bad pest of the sweet-potato vine. By H. Hacker—Specimens illustrating the life history of *Danaus menippe*, a butterfly introduced with its food plant (Asclepias curassavica). By H. Tryon—A number of insects off *Crotalaria alata* an introduced "Rattlepod"; specimens of one of the Gelechiadae allied to *Recurvaria*, a congregating moth found literally in clouds round about several trees in the Enoggera district, a number being seen on the excursion to Ithaca Ck.; a caterpillar found feeding in twigs of Eucalypts. By F. Burtt—26 ferns gathered by him on a recent trip to Coolangatta. By W. R. Colledge—A Sertularian, one of the marine hydrozoa. By C. T. White—Specimens of *Phytolacca decandra*, the American Poke-weed found establishing itself round about Woombye; two fungi *Poronia pileiformis* found in cow dung at Ithaca Ck., and *Battarea Stevenii*, a stalked puff ball from the Darling Downs.

EVENING MEETING, 20th JUNE, 1912.

Chairman : R. Hulsen.

Member elected : Dr. Jean White.

Report : On excursion to Indooroopilly—Prof. S. B. J. Skertchly gave an interesting and instructive account of the geology of the Indooroopilly One Tree Hill area.

Exhibits : By H. Hacker—A number of insects collected in Central Queensland by Mr. Ralph Higgins. By W. M. Tanner—Specimens of carborundum and samples of grindstones of various degrees of fineness made from same. By C. T. White—A number of plants from the Nanango district,

and a rare aquatic moss (*Conomitrium Muelleri*) found growing in still pools in the Coomera River.

EVENING MEETING, 18th JULY, 1912.

A special practical demonstration meeting was held on the above date. Mr. W. R. Colledge gave an interesting talk on microscopic technique, and demonstrated his remarks in a practical manner. Mr. C. T. White gave a short account on the methods of collecting and preserving botanical specimens, and gave information on the formation of an herbarium. Mr. E. M. Sherwin showed under the microscope specimens of Foraminifera from the shores of Moreton Bay, and also showed the use of several microscopic appliances. Mr. H. A. Longman showed a specimen of a young death-adder mounted in formalin on opal glass.

EVENING MEETING, 25th JULY, 1912.

Chairman : R. Hulsen.

Reports : On excursion to Goodna—(a) Pond-life by W. R. Colledge ; (b) Botany by C. T. White.

Papers : Dr. J. J. Harris read a paper on "Filarial Diseases," illustrated by a number of lantern slides. The President read for A. A. Girault notes on "The Habits of a Few Insects" (*vide* Transactions p 254.) and for Mrs. M. I. Hobler notes on "The Jabiru" (*vide* Transactions p. 255).

EVENING MEETING, 29th AUGUST, 1912.

Chairman : R. Hulsen.

Mr. H. Tryon referred to the pictures by Mrs. Ellis Rowan on exhibition in Brisbane, and moved, "With reference to the unique paintings of Australian (Queensland) wild flowers, now on public exhibition in Brisbane, the Field Naturalists' Club is of opinion that, inasmuch as these portray with scientific accuracy and high artistic skill many of the most beautiful of the beautiful objects of Queensland, our State should take steps to acquire them for the enlightenment and edification of its people."

Paper : A paper on palms, illustrated by a number of very beautiful lantern slides, was read by Mr. C. T. White for Mr. J. F. Bailey.

Mr. W. R. Colledge gave an account of the Pond-life of the excursion to Rocklea, and showed lantern slides of some of the specimens taken, and also a number of miscellaneous slides (chiefly Diatoms) of microscopic objects.

The rest of the evening was devoted to the display of wild flowers and other botanical specimens ; the chief exhibitors were Miss Sheldon and Messrs. Burtt, Hulsen, Longman and White.

EVENING MEETING, 26th SEPTEMBER, 1912.

Chairman : R. Hulsen.

Member elected : Miss M. Parker.

The President referred to the fact that the Government had purchased Mrs. Rowan's pictures, and satisfaction was expressed at this having been done.

Reports : On excursion to Currumbin—(a) Pond and shore-life by W. R. Colledge ; (b) Botany by C. T. White.

Lecturette : Prof. S. B. J. Skertchly delivered a lecturette on " The Geology of the Boyne Valley," illustrating his remarks by maps and diagrams.

Exhibits : By W. R. Colledge—Slides of Brittle Stars, etc., collected at Currumbin. By C. T. White—Plants from Currumbin. By R. Illidge—Specimens of the Cottony Cushion Scale (Icerya Purchasii).

EVENING MEETING, 24th OCTOBER, 1912.

Chairman : R. Hulsen.

Members elected : Dr. Butler Wood, Geo. Smith.

Reports : On excursion to Ashgrove—(a) Pond-life by W. R. Colledge ; (b) Botany by C. T. White.

Exhibits : By R. Illidge—A case of Euploea spp. Prof. S. B. J. Skertchly drew attention to the migratory habits of these butterflies, and mentioned having seen when off the coast of Queensland, numbers of them making due north, apparently for New Guinea, though strange to say none had ever been found there. By C. T. White—Photographs (published in the " Queenslander " for October 19th) of a large kauri pine (*Agathis robusta*) growing on the southern slopes of Mt. Cooroy, and representing the last big Kauri of the district. Mr. H. Tryon mentioned that he had seen reference in the same number to the last aboriginal of the district, and spoke on the desirability of the State possessing drawings and casts representing as near as possible all the aboriginal tribes of Queensland. Dr. F. Hamilton Kenny communicated specimens and notes on aerial roots in the common Tea-tree (Melaleuca leucadendron) and on the root-cap of *Pandanus pedunculatus*.

Presentation : The special business of the evening was the presentation of illuminated addresses to Messrs. Tryon and Holland, before their departure on a board of inquiry into the methods of eradication and utilisation of the prickly-pear, in recognition of the valuable services they each had rendered the club.

EVENING MEETING, 28th NOVEMBER, 1912.

Chairman : H. A. Longman.

Member elected : Miss H. Clark.

Report : On the Botany of the excursion to Broadwater by C. T. White.

Paper : Mr. H. A Longman gave a paper on "The Fertilisation of Orchids," and exhibited a large number of specimens, including a great many beautifully dried and mounted specimens of our indigenous terrestrial kinds.

Notes and Exhibits : Mr. R. Illidge exhibited a few rare insects collected at Currumbin, and read notes on same, and drew special attention to two pupae of a rare heteromerous beetle taken from under a log, one of which produced a perfect species of *Cyphaleus*. Mr. Illidge also read a few notes on and exhibited specimens of *Papilio Sarpedon*, a widely spread butterfly (Papilionidae), and drew attention to the fact that the Australian insect was much finer than the typical Indian form. Mr. R. Higgins exhibited a specimen of a new Phalloid (*Clathrus Higginsii*, Bail.) Mr. C. T. White showed specimens of *Cheiranthera linearis* and *Moluccella laevis*.

EVENING MEETING, 12th DECEMBER, 1912.

Chairman : R. Hulsen.

Exhibits : By E. M. Shearwin—Specimens of living larvae of *Antherea eucalypti*; also of wood-boring moth, *Xyleutes cineraria*, together with pupae cases and portion of bark showing where the young entered. By Dr. Butler-Wood—A climbing fish from Palm Island. By S. Ainsworth—Miscellaneous collection of butterflies and moths.

TRANSACTIONS.

BIOLOGY : THE SCIENCE OF LIVING THINGS.

By H. Tryon.

PRESIDENTIAL ADDRESS, READ AT THE ANNUAL MEETING OF THE FIELD NATURALISTS' CLUB OF QUEENSLAND, 25th JANUARY, 1912.

Our being associated as members of a Field Naturalists' Club, would imply special consideration for the study of living things, and a sense of the importance of this study. It is within our province, therefore, to note the value generally of this attitude of mind, to see how far it finds expression and to what extent it meets encouragement in Queensland.

Within the present week the results of the last Senior Public Examination held by the Queensland University have been announced. From this statement it will appear that amongst the subjects were two dealing with living things, viz., Physiology and Botany. Also that of the 52 of the total 66 candidates—all of whom save one were furnished by educational institutions—passes in the former subject were granted to two, and in the latter subject to ten ; and again, that only one student qualified in both. It may be added that this candidate was a woman, and that of the remaining eleven as many as ten were women also. More recently the results of the Technical College examinations have been pronounced, and these place the teaching of biological subjects in even still more unfavourable light. These incidents, especially, have prompted the selection of the topic I have chosen to address you on, in this my retiring address.

With regard to the systematic study of living things, as a branch of education, it may be urged that it is of the very greatest importance from whatever point of view it be regarded,—whether as an instrument for training the faculties, or as subserving utilitarian ends, in which respect it has co ordinate rank with the special physical sciences—physics and chemistry, that stand in fundamental relation to it.

The knowledge of living things, it is needless to remark, is concerned with both plants and animals, and not only so, but with the lower forms of life, occupying the border land between them, and is commonly spoken of as Biology. It has again, as subordinate branches, Botany and Zoology ; but much more is implied than is commonly understood as connoted by these terms, for we have essentially to deal with life and its manifestations, as well as underlying structure, and the developmental and other changes that it undergoes.

Passing over the transcendental inquiry regarding the nature of life, and especially the view that regards living organisms as chemical machines, whose automatic workings are merely illustrations of chemical dynamics, it may be pointed out, then, that to the student of Biology and Zoology alike, there is not only the consideration of the *structure*—however minute, of the organism; or, again, the particular branch of investigation spoken of under the terms "descriptive" and "systematic" (both of which provinces are usually concerned with organisms from which life has departed long since); or, again, the acquisition of a formidable nomenclature, embodying the terms that structural, descriptive and systematic considerations involve; but that the true knowledge of living animals and plants involves as well:—

(1) An investigation of living structure and its growth, or *Morphology*.
(2) An investigation of vital processes or functions, or *Physiology*.
(3) That of the development of the individual and race—including variation, heredity (genetics), etc., or *Evolution*.
(4) That of past history, *Palæontology*.
(5) That of habits and of relations to the many conditions of environment, or *Ecology* and *Ethology* (or Bionomics.)

This correct view of what is implied in the story of living things is, however, not to be regarded as depreciating the labours of structural and systematic naturalists, even when matters of geographical distribution have escaped their attention. Their work has been vast and important, and moreover from their exclusive standpoints it is unquestionable that both Botany and Zoology present considerable educational value, as well as serve most important economic ends.

The organisation of the animal or plant that is living, or has recently lived and is the scene of its several vital activities, necessitates for its detailed examination greater technical skill and facility for inquiry than the ordinary student—especially at the commencement of his career—will be able to command. This, therefore, except in its general outlines might be postponed. However, it should be impressed upon him that much may be found out by simple methods, and he should be stimulated to effort by being reminded of what the elder naturalists by their sole agency accomplished. But although the consideration of this more difficult undertaking may be deferred for the time being, it is still an integral part of Biology, and this must not be lost sight of. With regard to the study of vital functions

themselves, i.e., physiology, both of animals and plants, and insomuch as functions cannot be explained out of form alone, the student should be taught to adopt himself, as far as possible, the experimental method of inquiry. Quite simple appliances will indicate to him, for instance, that plants absorb fluids by their roots, and enable him to make the quantitative determination in this respect; so also how they transpire; their normal respiration; their growth and the measure of its extent, the force of habit; their relation to mechanical stimuli; to that of gravity (geotropism); and to the stimuli of light (heliotropism) and chemicals (chemitropism). So also root pressure; turgidity of tissues; movements of sap; and the simple facts of metabolism and transference of the food elements; or, again, pollination and growth, fermentation, etc.

With respect to Evolution as a branch of Biology, in variation he might be made to see for himself; so also transformations and phases of growth exhibited not only by animals—insects especially—but by plants too. Heredity again, he might study experimentally, and the main principle of evolution might be inculcated and facts demonstrated that tend to support it. In this connection he might learn the principal conclusions arrived at as to how organisms modify and how species originate, as well as the principal factors determining geographical distribution. As to the phases of Biology—Ethology and Ecology, habits again should be observed and studied. Further, he should be led to note the relations between animals and plants, and the circumstances of their occurrence; and in the case of the latter, their state and associations, as influenced by the determining factors of light or shade, heat or cold, dryness or humidity, formation and soil, conditions, elevation and exposure, the action and reaction between individual plants of the same and of different species under every circumstance of growth. So also with regard to animal life; and, again, the relations *inter se* between plant and animal organisms.

This latter division of the study of living things is appropriately termed Ecology. The scientific and general interest of this may be concluded from the fact that some investigators have regarded Biology of consisting almost exclusively in it. Thus Wiesner terms his account of the various phenomena of inter-relation between plant and environment "Pflanzenbiologie." (*cf.* "*Wiesner*" Biologie der Pflanzen 1889). And it is this aspect of living things that appeals alike to the philosophic naturalist and traveller as well as to he that delights to both dwell and sing in the realm of poetry. Our earliest botanical traveller,—Theophrastus, was essentially an Ecologist.

But lest it may be thought that this plan for the study of living things has reference only to the work of the schools

of higher learning, I may state as my opinion that it is not the case. It involves closer attention to a few living objects, and to what their life implies and imports, this rather than a superficial regard for many, in which the consideration of their vital characteristics, has no necessary place. It recognises also that science does not assist in the apprehension and remembrance of a number of facts only, but in the systematised and correlated knowledge of these facts.

BIOLOGY AND EDUCATION.

Now as to the educational value of this study of living things, i.e., Biology from our standpoint.

Formally, every one possibly will, on the grounds of utility alone, admit, without argument, that there should be included in the elements of a general education, in addition to the "humanities" that aim at the acquisition of a knowledge of what is best in thought and action, and at its expression, not only the principles of mathematics, of natural philosophy (physics), and of chemistry and their application, but some attention to geology (the history of the earth and its constituents), and to biology (including as we have seen zoology, botany, as branches of the study of living organisms), and, that to those who purpose pursuing "the higher learning," this especially should be so.

The study of living things or biology, and whether presented in the most elementary manner, or with further elaboration, if comprehensively pursued, has indeed great educational value; and, especially so, if presented with as little reference to books as possible; but on the other hand, with great regard for experience and experiment, and both on the part of teacher and taught.

1. It is a subject that at once appeals to the interest of the child, to whom living things are not only of large interest, but of supreme interest,—an interest that will admit of ready development; and no teacher but will admit what a factor in successful education, interest is. It calls forth and exercises every mental faculty. Those of perception, for example, are brought into operation in a special degree. Accurate and sustained observation is constantly in demand. The facts dealt with are those that can be verified by the student himself, and are not merely matters of tradition to be taken for granted, not again facts to be imagined or supposed. It recognises the importance of method and precision, in observation, in study, and in record. It exercises the mind strenuously in the methods of inductive reasoning; whilst the process of arriving at conclusions by deduction are not lost sight. For, although, as Huxley has pointed out (cf. "The Connection of the Biological Sciences with Medicine," *Intern. Med. Cong.*, 1881) all true science—and this applies to Biology especially—that is primarily

inductive, commences with empiricism; it is true science, exactly in so far as it strives to pass from the empirical stage, into that of deduction of empirical, from more general truths.

It leads to pleasurable pursuits, as has been well said: "The pupil under the influence of a teacher enthusiastic in the study of nature and natural phenomena, and thoroughly imbued with a love of truth, for its own sake, will find a new charm in his surroundings. His walks to and from school, or into the country, will yield an added pleasure, and his happiness will be multiplied." He will now "find tongues in trees, books in running brooks, sermons in stones, and good in everything," and so we have the genesis of the ideal field naturalist. It is an important contributor to general culture, for not only has the true student of living things, the possession of a high vantage point, from which he can view the domain of universal nature, an outer world to so many; but in acquiring a knowledge of Biology he becomes conversant with "a science that has affected all departments of human thought more deeply and more permanently than all the other sciences." He will possess, moreover, the key to much of what is best in our literature and art.

Although plants and animals have been regarded as the outcome of "the blind play of the forces of nature," and the student of biology may so regard them, or nobler interpretation of nature may pervade his mind and persuade him otherwise; and although this is not a necessary outcome of the study of plants and animals and all it involves, a sense of beauty will constantly be appealed to and ministered to, and he may feel with our dear old poet, Geoffrey Chaucer, all that he felt with regard to nature, and even towards the "wee, modest, crimson-tipped flower." "Thou bonnie gem" of Robert Burns. Even so the humble flower of the field will claim from him his reverence.

"In the ordinary mind, this study of living things is associated—it may be—merely with the idea of the capture of butterflies and moths, or the cutting of the pretty flowers, whose nectar they quaff; or it may regard the young devotee as a gatherer of shells by the sea-shore; or if other objects come within the range of his study, as one handling things repulsive and to be abhored. But suffer not the neo-phyte in the domain of biological science to be influenced by this opinion; let him rather be impressed by the names of great men, who have pursued one or more branches of it, long and strenuously, and have rendered themselves, notwithstanding, famous for all time. It has been well said that—"to make out the way in which the exquisite machinery of nature is meant to work, is no childish work. The very attempt will lead the naturalist to acquaint himself with scientific laws

which seem altogether foreign to natural history. It will exercise his ingenuity and sagacity. It will extend his knowledge of the possibilities of life." (Prof. L. C. Miall.)

BIOLOGY AND USEFUL ENDS.

Further, it may be claimed for the study and knowledge of living things that they have most important and far-reaching practical ends. This is not a consideration that always weighs with educationalists, but it is one that often does so with those who have a voice in deciding, the method which education shall proceed, as well as the scope of its endeavour.

It is not merely a matter to-day, of deriving from external nature the benefits contemplated by Shakespeare, when he wrote in his Romeo and Juliet the following:—

"O mickle is the powerful grace, that lies
In plants, herbs, stones, and their true qualities;
For nought so vile that on the earth doth live,
But to the earth some special good doth give."

Nor is it that Biology is a science that ministers, in an exclusive manner, to the requirements of the medical practitioner, whether concerned with human or animal pathology.

For almost every profession, every industry indeed, that is concerned with animals and plants—both high and low—or with their products or derivatives, implies a knowledge of the underlying principles of the science, or of the facts ascertained by its presentation, and, moreover, the pioneers in both have often been themselves biologists, or have had biologists for their guidance at their disposal.

To enlarge on this theme would involve our writing many chapters on the history of applied science. To mention a single illustration that afforded by the biology of some of the lowest kinds of plant life, belonging to the simpler forms of fungi. The vital activities of these enter into the following amongst other technical processes, that cannot be adequately carried out in the absence of knowledge concerning them:—Water filtration, deodorization, disinfection, colour production, tobacco-curing, hay-curing, ensilage production, alcoholic fermentation in bread, beer, wine, and spirit production, lactic and butyric fermentations in cheese manufacture, acetic fermentation, vinegar, citric acid production, tanning, the milk industries, cold storage of animals and meat and fruit alike, and last, but not least, soil improvement. Or take again the various bacteria, those diminutive representations of the plant world, and their often complicated functions, a knowledge of this covers a very wide field of practical operations concerned not only with hygiene, but also with industrial pursuits of many kinds. In fact, civil engineers who have pleaded for the inclusion of biology

amongst the subjects qualifying for their profession, in the interests of the sanitary branch of it especially have argued that "this is not less an age of bacteria, than it is an age of electricity, and have maintained also that better sanitation would result from thorough fundamental instruction relating to matter in the living state" (cf. "*Science*," 1896, p. 301)

Again, the study of animal and plant life has a very important bearing on rural industries, pastoral, agricultural and horticultural alike. This proposition is too obvious to need the support of any detailed statement for their scope is immediately identified with it; and indeed it might be maintained without difficulty—that other conditions being equal, the success achieved by any country in its rural industries has been proportionate to the extent to which it has applied the principles of the biological sciences in their development. In this respect the Aphorism of Bacon thus applies:—"Scientia et potentia humana in idem concidunt." And the important position that they are assigned, in any up-to-date institution, for training the pioneers of further advance in these rural industries, is an eloquent although indirect testimony to the same effect.

Before proceeding further, however, I will refer to two or three facts showing the bearing of the science of living things on this great department of human enterprise.

1. *The Soil.* Baron J. Von Liebig—one who has been regarded as the founder of agronomic science, taught us, in his "Natural Laws of Husbandry," and in other of his publications, that plants contained certain mineral constituents whose number was fixed, but that varied in the extent of their occurrence, and that the soil was a kind of trough that either originally contained those as required, or might receive them, and that these bodies—the food of plants—were fixed therein chemically or physically, but the latter only were available for their requirements. He further insisted on what he styled the law of the minimum:—"Every field (he wrote) contains a *maximum* of one or several, and a *minimum* of other nutritive substances. It is by the minimum that the crops are governed, be it lime, potash, nitrogen, phosphoric acid, magnesia, or any other mineral constituent, it regulates and determines the amount or continuance of the crops." (Liebig—J. Von, "The Natural Laws of Husbandry.—Ed. J. Blyth, p. 213, Lond. 1863.)

But it is now known that the merits of the soil as a crop producer are not merely determined by a knowledge of its chemical constituents, but that its tenure and structure have to be taken into account, as well as its conditions as regards temperature and moisture; but more than this—and it is my point—biological science teaches us that the soil is the theatre, for the continuous energetic and varied display of

the vital activities of different organisms, and, that these, though working unperceived have—as have also the physical conditions alluded to—as great an influence in determining the quality of plant growth.

The Director of Agriculture of Victoria, Dr. T. Cherry, writing regarding experiments in the growth of plants on the soils of the coastal plants of Victoria, reputed their failure to develop, even when these soils were abundantly (naturally) supplied with moisture, and artificially supplied with nitrogen, phosphoric acid and potash; the failing " to establish themselves, after the food supply contained in the seed was exhausted," and this he suggests arises from the absence of putrefactive and other bacteria which appear to be singularly deficient in the soil in its original state. (" Phosphoric Acid in Relation to Australian Soils and Vegetation." Austr. Association for Advancement of Science.)

We now know that not only does the soil support a varied growth of micro-fungi which in the course of their life influence its state, but bacteria of many kinds having special vital relations with it, that effect as they grow profound changes in it. Allusion alone may be made to those bacteria that influence the amount of nitrogen that it contains, on the form in which this important plant-food requirement is present, and available for use. In fact, regarded from the point of view of their several activities, these bacteria whose presence is alluded to, are termed the nitrogen absorbers, the nitrifiers and the denitrifiers; and their importance may be gathered of from the fact that recognising their action the agriculturist to-day may profit by their presence, which—where necessary —he may encourage, or even bring about. In fact, the branch of biology that is concerned with these soil organisms and their services is already very extensive. Then again to the student of plant life has been revealed the fact that the agriculturist has to take into consideration that the very plants that he cultivates may poison the soil either with special secretions from their roots, or the oxidising action inseparable from their growth. This knowledge again admits of important practical application in agriculture. The zoologist on his part points again to the office of earth worms in soil improvement as demonstrated by Charles Darwin of immortal fame.

2. *New Breeds and Improved Types.*—The modern biological doctrine of the origin of species and of types of both animals and plants, the discovery concerning variation and heredity on which this is based, and the modern branch of applied science connected with the latter named *Genetics*, are of great practical importance, both to the agriculturist and horticulturist on the one hand, and to the pastoralist

and breeder of animals on the other. Their value to one of these classes at least will appear from the fact that the two last International Conferences on Genetics, held in London and Paris respectively, were both under the auspices of most important horticultural organisations.

In fact, with regard to heredity—(1) the direct observations of Mendel, the conclusive evidence of a rigid experimental inquiry, and the inferences based thereon expressed in the law of dominance, that of disjunction and that of the independence of transmissible characters etc.; (2) the facts disclosed to Hertwig and Strasburger in the course of their profound microscopical studies of the living cell; (3) and the application of the mathematical law of probability to the variables figuring the experiments alluded to, concur in showing that plants at least may be raised with any definite transmissible character; (even such as floral precocity, cold resistance, drought resistance, disease resistance, as well as more obvious physical ones), that their progenitors exhibit, fixed and determined and thus, that results of great practical value may be won, from a province of biology the most abstract, and one apparently the most remote from the field of application. In fact, at the hands of M. W. Bateson we find cereal types arising that whilst possessing other esteemed qualities exhibit great resistance to rust occurrence, as the outcome of the practical application of Mendelism.

Earlier than this the rearing of plants, exhibiting a high standard of excellence in special qualities, had been accomplished by the application of other principles of biological science. In the course of his investigations at the Svalör Experiment Station, Dr. Nilsson had discovered (1) that what is ordinarily styled a breed or variety of wheat is in reality made up of a large number of distinct types, resembling each other sufficiently to be distinguished in the bulk from the types of other breeds, but nevertheless having important points of difference, and which are capable in skilful hands of being maintained apart in isolated individual plants; and further (2) that these new forms thus derived when sown thus apart always maintain the characters that had distinguished them. Hence (3) he conceived the idea that if progress in breeding was to be certain and rapid, it must start from a single ear, and that thenceforth subsequent selection was unnecessary. In Europe the recognition of these facts is said to have produced during the last 20 years great results in wheat breeding; and this also may be said of barley—barley for malting purposes especially.

In raising animals of definite type, by crossing, there are at present some obvious structural difficulties in applying the laws of Mendel, but the researches of the Russian savant,

Iwanoff, indicate that these difficulties are not insuperable. He, in fact, claims to have obtained results more certain and more important than are the outcome of ordinary breeding operations.

Apart, however, from this, the science of biology, and that branch of it, evolutionary history, as developed by Charles Darwin, has had, and still has, an important influence in deciding the best methods to pursue in raising improved breeds of animals.

Prior to the publication of "The Origin of Species," and of "Animals and Plants Under Domestication," in which are set forth many of the facts on which the former great work is based, stud-books, herd-books, and flock-books had come into existence, but it was through the incentive of his teaching that their present thoroughness came about, and although again "Breeding by Pedigree," had given place to "Breeding In and In," all the economic results obtained, though sometimes great, were always uncertain. It was his discussion of evolutionary history, detailed only in the works referred to, that pointed to the existence of general laws of heredity (now more exactly expressed in Mendelism), that governed them, and how they were to be applied. Thus through the application of biology a science of breeding underlies the practical art and results are controlled with a success our ancestors little dreamt of.

Thus, the agricultural student of to-day, aiming at the acquisition of useful knowledge and its application cannot afford to ignore the paramount classes of the two branches of Biology—Botany and Zoology. To mention again one more of the many applications of this branch of Biology to industrial concerns, one may allude to the important results in creating races of silkworms with approved qualities by Toyama Ishiwata and others through applying the facts that Mendel discovered governing heredity.

The knowledge of diseases of animals and plants, constitutional as well as parasitic, and the action of injurious insects on man, beast, or vegetable, and the means for preventing or overcoming them (matters of great practical moment to the agriculturist) is intimately connected with Biology, and has been largely built up within the last few decades step by step with its progress. But on reflection this must be so, since animal and plant pathology are but divisions of the science.

CONCLUSION.

1. *Method of Teaching.*—The success of the teacher of this branch of knowledge will largely depend on how he addresses himself to the work in hand, and the attitude towards it that he begets in his pupil. He should, as far

as is practicable, adopt the interrogative method, leading up to questions that make demands on greater and greater powers of accurate observation, concentrated thought, or even where investigation and experiment is needed—technical proficiency or skill.

He should remember in this connection the first of Bacon's aphorisms, relating to the understanding of nature and man's domain, with which he prefaces his great "Novum Organum Scientiarum":—*Homo, naturæ minister et interpres, tantum facit et intelligit, quantum, de natura ordine, re vel mente observaverit; nec amplius scit, aut potest.*

Man the servant and interpreter of nature can alone accomplish and know what he shall have seen or understood, nor can his knowledge or ability extend beyond this.

2. It should be a special feature in this branch of study that the pupil in obtaining his information, rely as far as possible on the objects before him, and what they show, and the use to which he puts them, manipulation and experiment—the latter having a very wide interpretation from the growing of a seed or the rearing of an insect to the planting of a field or raising a flock by himself or others, and then again are nature's own efforts experiments in a broad sense. He should learn to ascertain facts for himself either as their discoverer or their verifier; and not so much because he has been told about them, or has read about them, but because he has perceived them, either by the use of his senses, or by the use of his mind, exercised on what these convey. Deduction being a subsequent process. Thus, although he may accumulate "specimens," so called, in the course of his studies, his attitude towards them should rather be that of the child who pulls the insect or flower to pieces to see how it is made, finding more of what is precious, in crushing it, than its surface features indicate.

3. *Books.*—Books should be resorted rather for use as guides than for instruction. The great Dutch naturalist of the seventeenth century, Swammerdam, whose precise studies of insect life have never been eclipsed, writing concerning insect life said: "I would recommend everyone who wishes to know the truth about these things to learn himself of nature, for nature can teach in a short space of time more than any one can learn in a long course of years from many books."

In allusion to this he entitled the great work that embodies his researches made in 1863-73, and that merely a record of what nature revealed to him "*Bibliæ Naturæ.*"

4. *Attention Concentrated on Few Objects.*—Again Swammerdam's great enterprise and great book dealt with but a few objects, in fact, but twelve insects formed the subject thereof, including accounts of both domestic insects

—such as the honey bee—and wild ones, such as the May-fly.

5. This suggests the remark that the best results, to teacher and pupil alike, will accrue from considering few living objects, and considering them thoroughly, and so the most suitable books—whenever books are needed—will be those dealing with but few of these unless only when the student, whether teacher or pupil, be advanced so as to profit by ampler wealth in this respect.

6. At the same time it is as well to commence with the simpler forms of life before passing on to the more complex, although the opposite course is usually followed. The unicellular organism exhibits many of the functions of that, the most elaborate in structure, and for a while the student may be conveniently taught to regard it as the unit of life. So also animals exhibiting a more generalized form of structure should be studied before ones of more special types. Thus, for instance, the cockroach or grasshopper should be studied before the honey bee.

7. The correct expression of ideas by speech by writing or pictorially by delineation so important in education is of especial value in the student of biology. He should thus be always encouraged to make systematic notes, illustrating as far as possible the facts that have come under his observation, or what he sees in the course of his work. This is far more important that committing to writing what he is told, and immediately it is told, a procedure commonly styled "taking notes."

8. The appliances for the study of Biology in its elementary stages need be of the simplest nature, and generally may be self-contrived. As a rule, however, the teacher at once deems it essential to acquire an expensive and elaborate microscope, which is commonly in good order because little used. Swammerdam, the naturalist just referred to, and whose exact work and important discoveries have been the envy of all subsequent investigators to whom they have become known, employed simple magnifying glasses, scissors, knives, and needles, principally of his own contrivance; and dealing with insects, his work also involved the use of a few ordinary and special breeding cages. At the same time, it is well to inform the pupil of the existence and nature of this important instrument of research and of the further revelations beyond those that he has already observed that may be expected to be yielded by its use. These remarks have been suggested by the requirements of elementary zoology, but the same is true as regards botany, not excepting its physiological branch. The ground covered in the domain of biology when treating any living object, animal, or plant will be decided by the teacher according to the age and

proficiency of his pupil or other considerations. But one may follow the advice given by Herbert Spencer with regard to the admission of "Object Lessons," a phase of Biology at the very earliest period of the scholastic career, with some confidence object lessons he writes of as being "the primary cultivation of the senses," with which of course teaching commences. "They should not cease," he adds "with early childhood, but should be so kept up during youth as insensibly to merge into the investigations of the naturalist and the man of science." *

9. It cannot, however, be overlooked that in prosecuting the study of living things in both the primary, secondary, high schools and technical colleges, a present difficulty is the paucity and, perhaps, want in Queensland of teachers possessing an adequate knowledge of Biology, either on its Botanical or Zoological side; but this with the projected teaching college or colleges in connection with the Queensland University, duly inaugurated, and the inclusion of one or more biologists of recognised standard on its teaching staff, this difficulty is one that is capable of being overcome. Again, in any adequate provision for technical education, or for the development of Technology, the science of Biology, the study of all its branches must be recognised, and when referring to technical education, the claims in this respect of that branch spoken of generally as agriculture, should by no means be ignored.

Provision for acquisition of Biological knowledge at the University itself is being provided for, and the commencement made gives promise of the very best results; but these cannot be realised until this branch of knowledge so important to the State receives co-ordinate rank with Chemistry and Physics, and has a separate chair devoted to it.

In conclusion it is due to me treating of the office of "Biology or the Science of Living Things" in education, and when emphasising the apparent neglect of its claims to consideration in this state, to point to what is being attempted.

The "School Paper," in its three series, and in its several monthly issues, contains with scarcely an exception accounts and stories of animals and plants often beautifully and cleverly told. These convey generally correct and interesting pictures of the subject with which they deal, and have, no doubt, pedagogical value as instruments for conveying instruction; and, although they may arouse interest, they appear to have but little special educational value, and they seldom can be regarded as biological.

* Education, Intellectual, Moral and Physical, Lond., 1903, p. 58.

The Department of Public Instruction also issues Nature Study Leaflets to teachers, to guide them in their work, that are of merit as far as they go.

The non-official *Queensland Educational Journal* often again contains articles on nature study that conform to a high though special standard. But these seldom relate to biological topics, or are treated from the point of view of the biologist. I am especially encouraged to dwell on their excellence, seeing that they are the outpourings of a fountain of knowledge so replete, on which the club itself has been privileged to draw with such advantage. But all these are like cries in the wilderness, where thirstiness for the living water from the fountain of biological knowledge everywhere prevails.

NOTES ON THE HABITS OF A FEW INSECTS.

By A. A. Girault.

1. *Flies Reacting to the Odor of Carbide.*—During the late afternoon of January 19, 1912, while refilling an acetylene lamp in a forest near a cane field in the Mulgrave district (near Cairns), North Queensland, a large number of flies were suddenly noticed swarming over a spot on the forest floor, several feet away. Observation showed that they were gathered about a small amount of the nearly "spent" carbide, which had just been dumped from the chamber of the lamp on to the ground several minutes previous to the appearance of the flies. This residue had the distinct, disagreeable odor peculiar to carbide, and it is obvious that the flies had been attracted by it. They were not feeding upon it, but continued around it for half an hour or so, or until I left. On another spot, several fresh lumps of carbide were placed (about fifteen feet away) and moistened. Flies soon began to gather. The facts show how very sensitive is the sense of smell in muscoid flies, and how their food is found. All the species were muscoids belonging to the group which frequent decomposed flesh; *Musca domestica Linnaeus* formed a small proportion of them, but the majority appeared to be a single specie resembling a Lucilia. Their sudden appearance was the more noticeable because they were absent or unobserved previously. The same thing has been observed in primitive jungles when, at times, the absence of insect life appears to be total, they are so little seen or heard.

2. *Tettigids Swimming.*—Going through the grass to the edge of a small pool of water, about half-a-dozen tettigids hopped into the latter, and it was surprising to see with what ease they swam, using for that purpose the posterior tibiae

and the front legs. Only a few minutes elapsed until all of the six had regained the land. Progression is made by striking the posterior tibiae upward and back against the water, at the same time bringing back and down the front legs. The strokes are very rapid, and the body moves forward in a series of jerks. (Cairns, Queensland.)

3. *Jealousy in Pentatomids.*—A curiously coloured pentatomid, known locally as the "Skull Bug," because of the fact that small, yellowish-white spots are arranged on its back in such a manner as to suggest the grinning head of a mask or skull, was found mating upon the trunk of a gum tree, May 26, 1912, at Nelson (near Cairns), North Queensland. A second male was present, persistently attempting to dislodge the paired male. This habit occurs in a large number of insects, and it seems to be a true case of unconscious jealousy. The male desired the mate of the other male, and, consequently attempted to gain possession without any scruples. In the human animal something of the same sort occurs, tempered according to the nature and culture of the one concerned; in savages scruples would be few, and murder would often result, and such cases are none too rare to-day in more civilised countries. In the highest human beings, however, scruples would likely be many, and the female decides without hindrance in regard to her mate and choice once made, little or no interference is allowed or attempted. The case as concerns the insects is nearly the same in a very much cruder and primitive degree, altogether unconscious; still, the female selects from the available males, as she has the power to prevent mating, and chooses the one pleasing to her. This is not the case with all insects, however, the female falling to the male successful in the fight for her, as when some female moths "assemble" a crowd of males, the choice falling upon the one who first succeeds in clasping.

JABIRU (XENORHYNCHUS ASIATICUS).

I have just returned from a short visit to the Central District, inland from Rockhampton, and while staying at my brother's station on the Mackenzie River, was told a pair of jabirus were frequently seen at the lagoon, a splendid sheet of water just down from the house. I was fortunate in seeing these striking birds, and to witness a most interesting incident. One jabiru was slowly walking along in the water, keen and alert for prey, the other, more successful, was on the bank preparing his or hers—with the aid of the field glass I watched intently. The glittering object I at first supposed to be a fish was an eel at least two feet long, this was given various pecks, to produce, I suppose, the right degree of

" deadness," then picking up its victim the bird walked into the water, gave the eel what appeared to be a good washing, then with the long neck and beak well erected, the eel still showing signs of life, slowly disappeared.

M. I. HOBLER.

BOTANIC NOTES.—No. II.

By Cyril T. White.

Interesting plants collected during two excursions of the Field Naturalists' Club to Buderim Mountain and adjacent localities, 29th April-1st May, 1911, and 5th-8th April, 1912.

Dilleniaceae.

Hibbertia vestita, A. Cunn. ; *H. Billardieri*, F. v. M.

H. volubilis, Andr. (*Seeds* with a scarlet arillus), Mooloolah Heads.

Adrastaea salicifolia, D.C., Swamp near Mooloolah Heads.

Violarieae :

Ionidium suffruticosum, Ging. Lamina of lowest petal (labellum) in our specimens, yellow, turning pink in drying. Very common, especially under Casuarina trees between Buderim Mt. and the sea.

Pittosporeae :

Billardiera scandens, Sm., Buderim Mt.

Tremandreae :

Tetratheca thymifolia, Sm., Sandy land, Buderim Mt. and Mooloolah Heads. *Leaves* varying from opposite to five in a whorl. A good illustration of this plant is given in Bot. Mag., 8028.

Malvaceae :

Hibiscus heterophyllus, Vent., *var. genuinus*. Hoch. Ann. du Conserv. et du Jardin Bot. Geneve (1900) 122, common. Leaves varying from entire to deeply five-lobed.

Tiliaceae :

Elaeocarpus cyaneus, Ait. Mostly on sandy land Buderim Mt. and Mooloolah Hds. Usually a shrub or small tree, 6ft. and upwards ; leaves in some of our specimens only 1½in. long, some bearing fruits globose and only 3 lines diameter.

Rutaceae :

Zieria obcordata, A. Cunn. Forest country Buderim Mt., common.

Acronychia laevis, Forst, *var. normalis*, Bail. Common in the scrubs.

Meliaceae :

Cedrela Toona, Roxb., *var. australis*, C.DC. ; C. australis, F. v. M. (Maid. For. Fl. N.S.W., tab. 9 and 10.)

Melia Azedarach, Linn., *var. australasica*, C.DC. (Maid. For. Fl. N.S.W., tab. 96.)

Leguminosae :

Oxylobium ellipticum, R. Br., *var. angustifolia*, Benth. Edge of scrubs, Buderim Mt.

O. aciculiferum, Benth. Buderim Mt.

Desmodium polycarpum, D.C. ; *Mezoneuron Scortechinii*, F. v. M. ; *M. brachycarpum*, Benth ; *Acacia linearis*, Sims ; *A. Arundelliana*, *Bail.* Scrubs, Bunderim Mt.

Rosaceae :

Rubus rosaefolius, Sm. Common, some specimens collected quite glabrous.

R. Muelleri, Bail. A large scrambling species found mostly growing over the rocks, Martin's Ck., etc.

Saxifrageae :

Callicoma serratifolia, *Andr. Schizomeria ovata*, *D. Don.*

Abrophyllum ornans, Hook F. Scrubs between Buderim Mt. and Woombye.

Myrtaceae :

Callistemon salignus, D.C. Eudlo Ck. (Bark papery) ; *Eucalyptus robusta*, *Sm.*, nr. Mooloolah Hds. ; *Euc. botryoides*, *Sm.*, Creek sides and scrubs ; *Euc. resinifera*, Sm., the common " Stringybark " in the locality ; *Tristania conferta*, R. Br. forest country and edge of scrubs ; *T. laurina*, R. Br., along creeks in scrubs ; *Syncarpia laurina*, Ten., forest country ; *Myrtus tenuifolia*, Sm., Mooloolah Hds. (the *berry* when ripe is white, somewhat fleshy, nearly $\frac{1}{2}$in. diameter, and the seeds straw-coloured, smooth and polished and 1 line diam.)

Melastomaceae :

Melastoma malabathricum, Linn, *var. polyanthum*, Benth (M. polyanthum, *Bl.*) Cogniaux in A. and C., D.C., Monogr, Phan, Vol. 7 (Melast.) records both *M. malabathricum*, Linn, and *M. polyanthum*, Blume, from N. Aus. without specific localities.

Umbelliferae :

Trachymene incisa, Rudge, Didiscus incisus, *Dom. Monogr. der Gattung Didiscus*, p. 52, tab. 1, fig. 6, et, tab. 3, fig. 3. Forest land between Buderim Mt. and the sea.

Araliaceae :

Panax elegans, F.v. M., Maid. For. Fl. N.S.W., 1, 138, Pl. 24. Scrubs.

Compositae :

Lagenophora Billardieri, Cass. *forma microcephala*, Benth, Forest country, fairly common.

Carpesium cernuum, Linn., Muell, Fragm Phytogr IX. (1875) 161. L. A. Bernays, Jl., Linn. Soc. (Bot.) XVII. (1878) 267. A common weed in paddocks and at edge of some of the scrubs.

Cassinia subtropica, F.v. M. Scrubs.

Epacrideae :

Trochocarpa laurina, R. Br. Buderim Mt. (*Fruit* when fresh, succulent and of a bluish purple colour) ; *Leucopogon lanceolatus*, R. Br., var. *gracilis*, Benth ; *L. Richei*, R. Br. ; *L. juniperinus*, R. Br. ; *Monotoca elliptica*, R. Br. ; *M. scoparia*, R. Br. Mooloolah Hds.

Acanthaceae :

Eranthemum variable, R. Br. A form of this plant with the leaves prominently variegated with broad whitish streaks down the main nerves was collected in the scrubs between Buderim Mt. and Mooloolah Hds. ; this form of variegation is common in the genus, and I have often seen plants of this particular species in our scrubs round about Brisbane with the leaves more or less marked with pale stripes along the main nerves, and usually purplish beneath.

Amarantaceae :

Achyranthes aspera, Linn. Buderim Mt. ; a rather robust form, leaves attaining 6 inches.

Labiatae :

Plectranthus parviflorus, *Willd* var. *minor*, Bail 21 Agric. Jl., XXVIII (1912) 199 Pl. 41. Buderim Mt. ; flowers varying from light blue to deep bluish purple, especially deep in the specimens found growing on the rocks at Martin's Ck.

Proteaceae :

Lomatia silaifolia, R. Br. Buderim Mt. and Woombye. Two pubescent forms of this plant were collected, the one with very finely cut twice or thrice pinnate leaves silky pubescent beneath, sprinkled with a few hairs above, perianth segments, pubescent about 5 lines long, the other with the leaves simply pinnate and the segments much broader, silky pubescent beneath and sprinkled with a few hairs above perianth segments 6-7 lines long, this latter is evidently the *var. induta*, F.v.M., and under which perhaps both these forms should be included. The distinctions between *L. silaifolia* and the cut leaved forms of *L. ilicifolia* are not at all clear, but I think, however, that both our plants belong to *L. silaifolia* rather than to *L. ilicifolia*.

Loranthaceae :

Loranthus pendulus Sieb., common on Casuarina and Eucalyptus.

Loranthus dictyophlebus, F.v. M. Buderim Mt., parasitic on a number of different trees. *Berry* scarlet, about ¼in. in diameter.

Notothixos cornifolius, Oliv. on Casuarina trees, common.

Euphorbiaceae :

Phyllanthus albiflorus, F.v. M., Common forest country; *Breynia oblongifolia*, Muell. Arg.; *Macaranga Tanarius*, Muell, Arg.; *Homalanthus populifolius*, Grah., common in the scrubs.

Mallotus claoxyloides, Muell. Arg. var. *angustifolia*, Bail. Very common on Buderim Mt., flowering and fruiting when only a few inches high. Peduncles sometimes rather short.

Urticaceae :

Pipturus argenteus, Willd. Buderim Mt.

Casuarineae :

Casuarina glauca, Sieb. Swamps nr. Mooloolah Hds.

C. equisetifolia, Forst. var. *incana*, Benth. Coastal lands, Mooloolah Hds.

C. torulosa, Ait. and *C. suberosa*, Ott. et Dietr., are very common trees between Buderim Mt. and the sea, the latter is especially common, and evidently very variable.

Orchidaceae :

Liparis Simmondsii, Bail. Martin's Ck., Buderim Mt. The flower of this orchid is as yet unknown.

Scitamineae (Zingiberaceae) :

Alpinia caerulea, Benth. Common in the scrubs and known locally as " Wild Ginger."

A. caerulea, Benth. var. *Arundelliana*, Bail, A. Arundelliana, *Schum.* Fairly common in the palm scrubs between Woombye and Buderim Mt. Leaves smaller and of a darker green, and the fruit of a deeper blue, but equal in size to that of *A. caerulea*.

Liliaceae :

Rhipogonum Elseyanum, F.v. M.: Hk. Ic. Pl. 396. Scrubs between Woombye and Buderim Mt., not so pubescent as usual. *Berry* red, 4-5 lines diam.

Xyridaceae :

Xyris complanata, R. Br., Prod. 256; Benth. Fl. Austr. VII., 77; Rendle *Jl. Bot. XXXVII.* 500 and 505. Swamp near Mooloolah Hds. A form with scapes attaining nearly 3 ft. in height and leaves over 1ft. this form agrees well with the plant described in Hook. Fl. B. India, p. 364, as *X. anceps*, Lamk. included by most writers in *X. complanata*, R. Br. Smaller forms were common in the same swamp.

Flagellariaceae :

Flagellaria indica, Linn. In scrubs.

Juncaceae :

Xerotes longifolia, R. Br. Mostly in damp places.

X. longifolia, R. Br. var. *montana*, Benth. Fl. Austra. VII., 98. Xerotes montana, *R. Br.* Prod., 262, Bail. Ql. Agric. Jl. XXVIII. (1912) 203. Buderim Mt., in sandy ground, creek sides.

Panicle reduced to a simple spike. These specimens seem to differ somewhat from the typical *X. montana*, R. Br. in the spike attaining a length of 5ins., and the subulate bracts 6 lines ; the *capsules* which are of a bright orange colour are densely packed on the spike, making a striking plant very different in general appearance from the common *X. longifolia.*

Juncus vaginatus, R. Br. Mooloolah Hds.

Palmae :

Archontophoenix Cunninghamii, Wendl. et Drude, Piccabeen Palm, very common.

Bacularia monostachya, F.v. M. Walking-stick Palm; in the gullies and creek scrubs.

Livistona australis, Mart. Cabbage Tree Palm ; mostly in the scrubs between Buderim Mt. and the sea, and where it is very common.

Calamus Muelleri, Wendl. et Drude.* Small Lawyer Cane ; common in the scrubs.

Pandanaceae :

Freycinetia Gaudichaudii, Br. et Benn ; common in the scrubs, the fruits are of a rich crimson colour when ripe, and collected in dense spikes of 1-2in.

Naiadaceae :

Potamogeton javanicus, Hassk. ; Collett, Flora Simlensis, 547, fig. 179 ; Koorders, Excurs. Fl. Java 1, 89, fig. 10. Eudlo Ck.

Restiaceae :

Restio gracilis, R. Br. Swamp near Mooloolah Hds. ; *R. tetraphyllus*, Labill. Mooloolah Hds. and between Buderim Mt. and Woombye ; this plant when well grown is a very handsome one, the stems are often several feet, with innumerable, slender, barren branchlets of a feathery appearance; known locally as " Boys' Love."

Cyperaceae :

Scleria chinensis, Kunth. Mooloolah Hds.

Rhyncospora Wallichiana, Kunth. Swamp near Mooloolah Hds. ; stems over 30in.

* A revision of the Queensland Calamus (from Dr. O. Beccari's Monograph) will be found in the Queensland Agric. Jl. for Dec., 1909.

Gramineae :

Panicum melananthum, F.v.M. In damp places, scrambling over rocks in creeks, etc., Buderim Mt. ; *Eremochloa bimaculata,* Hack. Buderim Mt. and Mooloolah Hds. ; *Pollinia argentea,* Trin., wet swampy land Mooloolah Hds. ; *Eragrostis Brownii,* Nees, var. *interrupta,* Benth; Poa interrupta, *R. Br.* Sand dunes Mooloolah Hds. In several places large patches of *Paspalum platycaule* were seen, it is, however, evidently introduced into the locality.

Filices :

Gleichenia flabellata, R. Br. Buderim Mt.

Lindsaea incisa, Prentice. Found growing under Casuarina trees and fairly common near Mooloolah Hds.

Blechnum cartilagineum, Sw. Forest country; *B. serrulatum,* Rich. Swamps near Mooloolah Hds.

Besides the above the following ferns occur in this locality :—*Botrychium ternatum, Lygodium scandens, Trichomanes rigidum, Alsophila australis, A. Leichhardtiana, Davallia pyxidata, D. dubia, Adiantum aethiopicum, A. formosum,* R. Br., *A. affine, A. hispidulum, Pteris paradoxa, P. falcata var. nana, P. tremula, P. aquilina var. esculenta, P. incisa, Lomaria Patersoni, Doodia aspera* and *var. heterophylla, Asplenium nidus, A. attenuatum, A. umbrosum var. tenerum, Aspidium cordifolium, A. molle, Polypodium punctatum, P. tenellum, Platycerium grande, P. alcicorne.*

EVENING MEETING, 27th MARCH, 1913.

Chairman : H. A. Longman. Attendance, 18.

Members elected : Miss F. Bage, M.Sc., W. D. Gillies, J. Colvin, W. McComb, S. Middleton, and J. Walker.

Reports : A report on the pond-life of the Goodna and North Pine excursions was given by Mr. W. R. Colledge, who exhibited a number of lantern slides in illustration. A report on the Entomology of the Goodna excursion was given by Mr. R. Illidge, who read notes on *Anostostoma australasiæ* (vide Transactions, p. 275), the most interesting find obtained on that occasion. A report on the Botany of North Pine and Goodna excursions was given by Mr. C. T. White.

Exhibits : By H. A. Longman—Living specimens of the South African Chameleon and of a Queensland Gecko (*Gymnodactylus cornutus*, Ogil.) or Leaf-tail Lizard. By W. M. Tanner—Miscellaneous entomological specimens.

EVENING MEETING, 24th APRIL, 1913.

Chairman : H. A. Longman. Attendance, 30.

Members elected : Miss May, J. Cowan, W. Ewart.

Papers : Prof. S. B. J. Skertchly gave a very lucid and interesting account of Mendelism, illustrating his remarks by a specially prepared diagram. Mr. F. Burtt read a paper on the "Cultivation and Propagation of Ferns."

Exhibits : By R. Higgins—Two frogs identified by Mr. Longman as (1) *Limnodynastes dorsalis*, a burrowing species; and (2) *Hyla Peronii*, a tree frog. By Miss H. Clark—An interesting lizard (*Lygosoma verreauxii*) found in a Brisbane garden, and a number of botanical specimens from the Blackall Range. By C. T. White—Coloured sketch of the North Queensland orchid *Cymbidium Sparkesii*, and specimens of the Stink Grass (*Eragrostis major*).

EVENING MEETING, 22nd MAY, 1913.

Chairman : H. A. Longman. Attendance, 36.

Members elected : Rev. W. Smith, F. Reimers.

Reports : On excursion to Rosewood,—(*a*) Entomology, by R. Illidge; (*b*) Botany, by C. T. White.

Papers : Miss F. Bage, M.Sc., gave an interesting lecture on "Phosphorescence in Plants and Animals," illustrated by an extensive series of lantern slides. Mr. R. Illidge read a short paper "Notes on Insects From My Garden" (vide Transactions, p. 276).

Exhibits : By J. L. Carrick—A number of dried specimens of ferns, liverworts and mosses, collected in the vicinity of Inverary, Scotland. By R. Higgins—Plant in pot of *Muhlenbeckia platyclada*. By F. Burtt—Complete collection of ferns of the Enoggera district.

EVENING MEETING, 26th JUNE, 1913.

Chairman : H. A. Longman. Attendance, 56.

Member elected : Mrs. Parker.

Lecture : Mr. W. Ruddle screened a very complete collection of fossil animals as restored by various scientists, and gave a few succinct notes on each slide.

Exhibits : By Mr. W. M. Tanner—A case of miscellaneous entomological specimens. By Prof. S. B. J. Skertchly—Specimen of the Tailed Emperor Butterfly (*Charaxes sempronius*), bred by Miss Vivian Schneider of Nerang. By E. M. Shearwin—A specimen of the Spiny Crab Matuta victor and two wasps' nests. By C. T. White—A number of plants from Cooktown, collected by Miss E. J. Beattie.

EVENING MEETING, 24th JULY, 1913.

Chairman : H. A. Longman. Attendance, 16.

Members elected : Mrs. Macfarlane, Miss Exley, J. B. Price.

Reports : On excursion to Nudgee (*a*) Pond-life, by W. R. Colledge ; (*b*) Botany, by C. T. White.

Exhibits : By C. T. White—Plants from the Darling Downs. By Miss Rossiter—A collection of sponges from Caloundra.

Prof. S. B. J. Skertchly referred to the death of Mr. L. C. Green, M.I.M.E., and spoke in eulogistic terms of the life and work of the deceased scientist, and moved that a letter of sympathy be sent to the widow.

EVENING MEETING, 21st AUGUST, 1913.

Chairman : R. Illidge. Attendance, 17.

Members elected : Miss C. M. Rossiter, F. Smith, B.Sc.

Papers : Mr. R. A. Dart delivered an interesting lecture on "Foraminifera," illustrating his remarks by means of lantern slides and diagrams. Mr. C. D. Gillies read a paper "On the Foraminifera of Masthead Island," and gave an account of the various genera met with, and showed enlarged illustrations of each.

Exhibit : By W. R. Colledge—Lantern slides of Foraminifera and of some interesting specimens obtained on the club's visit to the Botanic Gardens.

ANNUAL BOTANICAL MEETING, 30th AUGUST, 1913.

Chairman : H. A. Longman. Attendance, about 50.

Members elected : Miss K. A. Corris, Rev. F. Greenwood, R. A. Dart.

The President introduced the Rev. Douglas Price, who gave a most eloquent address on " The Colours of Leaves."

Mr. W. R. Colledge showed a very fine set of slides of microscopic plant-life, and made a few interesting remarks on each specimen. Mr. C. T. White exhibited a series of lantern slides, mainly representative of trees and shrubs of the Brisbane district, and mostly taken on the outings of the Club.

The main contributors to the general exhibit of wild flowers and miscellaneous botanical specimens were :—Mr. W. Smith—Wild flowers from Dunwich. Mrs. Pattinson—Wild flowers from Scarboro, including a number of ground orchids. Mr. R. Higgins—Skelcton leaves from the floor of a North Queensland scrub. Mr. F. Burtt—Living specimens of orchids. Mr. H. A. Longman—Dried and mounted specimens of Australian orchids. Mr. C. T. White—Wild flowers from Sunnybank, dried specimens, native fruits and a number of drawings of Queensland plants.

EVENING MEETING, 20th SEPTEMBER, 1913.

Chairman : H. A. Longman. Attendance, 26.

Member elected : G. Pearce.

Reports : On excursion to Russell Island (*a*) Pond-life, by W. R. Colledge (*b*) General biology, by R. A. Dart ; (*c*) Botany, by C. T. White ; (*d*) Pteridology, by F. Burtt.

Exhibits : Mr. W. R. Colledge gave a general account of the excursion to Russell Island, and showed a very fine set of lantern slides from photos. mainly taken by Mr. G. Rowley. Mr. J. L. Carrick exhibited a specimen of the English Primrose (*Primula vulgaris*), grown near Brisbane, from specimens forwarded to him from Argyllshire, Scotland.

EVENING MEETING, 30th OCTOBER, 1913.

Chairman : H. A. Longman. Attendance, 16.

Members elected : A. Taylor, N. V. I. Agnew.

Correspondence : A letter was received from Mr. G. F. Bennett, C.M.Z.S., enclosing a circular from the General Secretary of the Zoological Society, London, asking for living specimens of larvae, pupae, etc., for their new insect house.

Paper : Mr. H. A. Longman gave an interesting account of the "Wild Flowers of Noosa Heads," illustrating his remarks with a number of dried specimens obtained on a recent trip to the locality.

Exhibits : By R. Higgins—Plants from Stanthorpe, and three specimens of a "sea-mouse," one of the *Polychaeteae* or Marine Bristle Worms. By H. A. Longman—Living specimen of the Gecko Lizard, *Nephrurus asper.* By C. T. White—A number of botanical specimens collected on the club's excursion to Darra. By Miss Illidge—Drawings of wild flowers from West Australia, also a number of dried specimens of same.

EVENING MEETING, 27th NOVEMBER, 1913.

Chairman : H. A. Longman. Attendance, 25.

The meeting was set apart as a commemoration of the late Alfred Russel Wallace, and an eloquent tribute to the distinguished scientist was given by Professor S. B. J. Skertchly. Having been for many years acquainted with Wallace, and associated with him in scientific work, the speaker was able to give many personal reminiscences. The modesty, humanity, and enthusiasm of the great naturalist were illustrated and emphasised, and his contributions to science and the thought of his day were dealt with. At the close the president (Mr. H. A. Longman) and Messrs. D. O'Connor, R. Hulsen, D. Eglinton, and R. Higgins expressed their appreciation of Prof. Skertchly's remarks.

EVENING MEETING, 6th DECEMBER, 1913.

Chairman : H. A. Longman.

A special meeting was held on the above date for the display of specimens under the microscope. The meeting took the form of a conversazione and there was an attendance of 37 members. Specimens were shown by Messrs. W. R. Colledge, W. M. Tanner, A. Flint, E. Jarvis, E. H. Shearwin and C. T. White.

TRANSACTIONS.

HEREDITY.

By. R. Hülsen.

PRESIDENTIAL ADDRESS, READ AT THE ANNUAL MEETING OF THE FIELD NATURALISTS' CLUB OF QUEENSLAND, JANUARY 26TH, 1913.

When you did me the honour of electing me as your President, I accepted this, the highest position you are able to bestow on any of your members, on the distinct understanding, that you were not to expect work from me such as has been done for you in the past by my predecessors. These have all been active scientists, and were able to give you out of their font of knowledge, the results of practical application of science. But as you know, I am not an operative, but rather a speculative "scientist," if the term may be applied to such as I am; still, the very fact that I am not an experimental scientist may enable me to bring some things nearer to some of those members of our club which are in the same position as I am.

There are some matters which have been subject of speculation for many years, because their very nature precluded the application of microscope or test tube. The problem of life is the mystery which is responsible for more speculation—vain,—and is likely to remain so for some time. The problem of Heredity is scarcely less mysterious, but as there are now at least some tangible facts, it may possibly be nearer solution than the first.

Heredity became a great problem when the idea of fixed species broke down. It could be demonstrated comparatively easily that species were not fixed, but in a constant state of mutation, that the individuals of each species differed among themselves, that the offspring of each parent while retaining the features of the species were not the same in every detail. But why were they different from the parents, why not quite alike, why under some conditions were they not more unlike? Are any acquired characteristics passed on directly to the offspring, or is the differentiation of the species due to environment acting on and preserving chance alteration in the offspring, which are favourable to its surroundings? All these are problems which are still agitating the minds of the foremost scientists of to-day. But they all centre around the problem of Heredity, and will find their solution with the solving of it.

The problem of Heredity is necessarily bound up in the problems which the science of embryology is doing so much to solve. The more advance was made in the knowledge of the structure of the cell, its nucleus, and its functions, the processes of cell divisions during the ripening of the eggs and sperms, the more prominent became their influence on discussions on Heredity. Galton, as a result of observation, was the first to have a nearer insight when he propounded his theory of the stirp. This he imagined to be a something preserved from each germ-cell, and passed on in proportion to succeeding generations, providing this for a continuity. He made many careful observations and measurements, and formulated an exact law. According to this law, each parent contributes together one-half of each inherited faculty, $\frac{1}{4}$ each. The four grand-parents (each 1/16), the great-grandparents - 1/16 = (1/32 each), etc.; the total amounting to 1. You will notice that each term is equal to all following numbers. Always understood that averages only are dealt with. Prepotencies in some ancestors have little chance of asserting themselves, and everything would tend towards the average.

This law of ancestral heredity has been expanded by the study of Biometry into attempts to improve the human race under the name of Eugenics, and much valuable work is done, especially by Prof. Karl Pearson.

The most searching and practical work on Heredity has been done probably by Weismann. When he enquired for actual proofs of transmission of acquired characters, he was not able to find a really satisfactory one. He, therefore, studied the process of fertilisation and growths of the embryo, with a view of either proving or disproving it. His researches ed him to formulate his theory of the germ plasm.

He first distinguished between two kinds of substance in cells, germ-plasm, and somatoplasm. This last is the ordinary substance of which body cells may be said to be composed of, but has no reproductive powers. The germ-plasm is restricted to germ cells only, which also contain somatoplasm. These, therefore, possess the potentiality of building up the body anew, and also provide a continuation of the species through continuous germ-cells, and inheritance depends on the continuance of the germ-cells. He elaborated his theory from time to time. He said later (1892): "This substance can never be formed anew; it can only grow, multiply, and be transmitted from one generation to another." My theory, therefore, may well be termed "Blastogenesis," or origin from the germ-plasm, in contradistinction to "Pangenesis," or origin from all parts of the body, which was Darwin's idea. Germ-cells alone transmit the reproductive substance or germ-plasm in uninterrupted succession

from one generation to the next, while the body which bears and nourishes the germ-cells is, in a certain sense only an outgrowth from one of them.

The ultimate constituents of the germ-plasm are the Biophores, each of these being a group of molecules, on which the phenomena of life depend. These Biophores, unlimited in kind, constitute all protoplasm, and each kind corresponds to a different part of a cell. They are grouped together to form "determinants," which are the entities, deciding the nature of any particular kind of cell, any particular structural character, or function. In the cell nucleus they are grouped together to form "ids," and the chromosomes of the cell nucleus are called "idants." The cause of each determinant reaching its proper place in the body depends on the fact, that it takes up a definite position in the id of the germ-plasm. Every independently variable character is represented in the germ-plasm by a determinant. Each idant is made up of a full set of ids, determinants, and biophores.

The mode of reproduction of the higher animals is bisexual, where one germ-cell unites with another. As under Weismann's views each chromosome, or idant, of egg or sperm contains the full set of ids, etc., in fertilisation these two are mingled. In the development of the fertilised egg, it is its composition, due to this mingling of the constituents, derived from two different ancestral sources, which determines everything in the constitution of the resulting individual. The development is a process of unfolding, with preformation, each different part, or characteristic, being present in the fertilised ovum, and its development is predestined, and he rejects the theory of the gradual adding of part to part—or Epigenesis.

Amphimixis, the term used by Weismann for this mingling, is held to be the uniting of the hereditary influences of two individuals. The resulting organism must, therefore, take on traits of both parents, while the combination of the ids from each parent, which are dissimilar through forming new combinations, is the cause of difference from the parental forms and the cause of variation. It is held to increase the capacity for adaptation of the organism to its surroundings, because by it, the simultaneous adaptation of many parts is possible, and by means of "germinal selection fosters the elements favouring a progressive variation, and eliminating unfavourable tendencies."

The theory is, of course, largely hypothetical. There is no proof that the development takes place as he states. It is only the chromosomes (idants) which are visible under the microscope; ids and biophores are a pure mental conception. Their existence remains to be proved by experiment and research into the structure of the cell.

For a long time it was believed that the nucleus of the cell was destroyed at each division, and the nuclei of the daughter cells were entirely new, therefore, as they could not carry anything, they could be ignored in any theory of heredity. Better methods and more powerful instruments, however, revealed the existence of remarkable structures.

It was found when the reticular frame work of the nucleus prepares to divide, it separates into single segments, which, becoming thicker and denser, are formed into rods of uniform thickness. From the fact that they readily accept different stains, they are called "chromosomes." In the course of division each chromosome is divided into two exactly equal halves. The nuclear membrane then disappears, and cytoplasm, e.g., the contents of the cell invade the nuclear area centreing around special bodies called centrosomes. Radiating lines into the cell-plasma suggest that these bodies are centres of force. A spindle from each pole is formed, the fibrilla of each grasping the longitudinally divided chromosomes from the two opposite sides, and arrange them as the nuclear plate Each half chromosome is connected with one spindle only, and is then drawn toward that pole. The cell then divides into two. Compared with the process of dividing the nucleus, that of the cytoplasm is very simple, and this led to the conception that the cell nucleus is the chief, if not sole, carrier of the hereditary characters of the organism, which was held to be proved as in flowering plants, only the nucleus of the sperm reaches the ovum, and they still show all phenomena of heredity.

Further investigation showed certain differences in reproductive cells—gonotokonts—and body cells, which carry fewer chromosomes. A peculiar characteristic of gonotokonts was also observed, a very rapid division following one another. Further, that the chromosomes unite in pairs. It is these pairs, and not the single chromosomes which are attached by the fibrillae, so that the number of chromosomes contained by the daughter-cells is reduced by half, while in the division of ordinary cells the number remains the same. Each of the chromosomes has already completed the longitudinal fission, but in the next division, which follows rapidly on the first, they are not succeeded by an immediate separation and allotment to different nuclei, and are therefore ready for the next division Through a number of careful observations the fact was established that the doubling of the chromosomes, which necessarily accompanies fertilisation, is maintained in the product of fertilisation to be again reduced to one half in the gonotokonts at the stage of reduction division. Thus, the conception of the essence of true alternation of generations containing double and single chromosomes alternating with one another was formed

Attention was drawn to the faet, that during the reducing division of nuclei which contain chromosomes of unequal size, gemini are constantly produeed by the pairing of chromosomes of equal size, whieh led to the conelusion that one comes from the father and one from the mother. It would seem that the component parts of each pair might pass to either pole, so that the paternal and maternal chromosomes would be distributed in varying proportion between the daughter nuelei, and it is not impossible that one daughter nucleus might oeeasionally contain paternal chromosomes only, and the other maternal ehromosomes only. The fact that in nuclei eontaining ehromosomes of different size, the joining chromosomes are always of equal size, constitutes a further proof of their qualitative difference. This has been proved to be the case by experiments. To recapitulate,—the ehain is not parent—germ-cell—embryo, but parent, egg fused egg—asexual germination.—primary germ-eell,—secondary germ cell, which divide into two lines—one forming the individual, the other forming germ cells, to be used for the eontinuation of the species.

These are the faets that have been established in connection with the process of fertilisation and division. They go to prove, that, though built up by speculation, they give a groundwork to Weismann's theory. What requires elueidation is not, how are the chromosomes or idants arranged in the subsequent division, but what determines the formation of the idants in the parent—the sperm and the ovum—and whether, environment during the life of the individual has any direct influence on the formation of the chromosomes of the germ-eells.

The evidence so far seems to show that there is no such influence, beeause germ-eells are formed from germ-eells only whieh are present already in the embryo, and are not formed from body—or soma eells. Each germ eell, sperm and ovum, contains all the potentialities to form complete individual, not neeessarily material entities, such as biophores. At fertilisation these are joined together. In the developing proeess one eomplete set only of these is unfolded, and while the eorresponding set remains dormant, the set employed may be composed of eharaeters of either set. The second set is eliminated at the reduction stage, and those eharaeters are ehosen which are best adapted to the environment, and in this way the environment influences the variation and adaptation of the new organism An alteration of natural eonditions will be followed by the alteration of the speeies, not the alteration of the individual. New varieties arise in adaptation to the new environment, for on this faeulty the living organism depends for eontinuation.

Germinal election and elimination offer a simple explanation of all the phenomena of variation. They explain why characteristics, which are not favourable or necessary to the individual are eliminated others formed. Such, for instance, as the loss of the hind legs of the whale, the degeneration in the molluscs. They explain much more rationally, why the giraffe has a long neck. This is not because the animal was in the habit of stretching it; the effect of it being handed on as a special character; nor, as Darwin says, those who could not stretch enough were eliminated but simply because nature eliminated those potentialities which tended to produce short necks, while fostering those which tended to produce long necks, and increased these values from generation to generation.

But the embryo or individual is only an incident in the chain of certain phenomena. At the time prior to the unfolding of the individual all germ-cells are alike; so much so that if all germ-cells were to develop and form embryos they would all be alike in potentialities and character. Identical twins are not at all of rare occurrence. Francis Galton traced the history of about 80 of them, as far as he could, and noted the frequency at which both suffered at the same time from identical ailments, such as cancer. In some cases he found a remarkable association of ideas. But until determined theoretically, it was not observed that two kinds of identical twins occur. In the one kind, say A. B. and A. B., we deal with individuals, cast as it were in the same mould; while in the other kind A. B. and B. A., the one is a looking glass image of the other, and this reversal even extends to the reversal of the visceral organs.

These facts can only be explained by theories of Heredity based on an actual continuance of germ-cells. By cell division of the fore-runners of the germ-cells, germ-cells are formed with like potentialities and character. These products are right and left handed. If two right or two left hand products grow and develop, they result in identical twins of the same mould, if a right and a left, looking glass, or reversed, identical twins are the result.

Butler, from his speculative imagination, and Hering, as a result of his researches, have come to the conclusion that "unconscious memory" is the simple explanation of all phenomena of Heredity. We link together yesterday and to-day, childhood and old age into a continuous chain by memory. Memory is a property of living matter. Of two primary cells of any animal development, one becomes the individual—the other continues the cycle of the germ-cells. So alike are they, that had they developed they would have been identical twins. Neither of them in the ancestry had ever been a higher animal, neither they nor

their unicellular ancestors had ever formed part of such. But this ancestry is continuous with a long line of germ-cells, and at regular intervals of time, these were like sister cells, which did develop and formed embryos. "The whole individual development of a higher animal forms from this point of view a continuous chain of recollection or memories of the history of development of that great series of beings whose last link is this animal, called Homo sapiens."

But again, if this be so, the realisation of it must have a great influence on the outlook on life and our conception of life forces. We cannot then for a moment regard life and the manifestations of life as a merely chemical process, because the guiding stimulus is not of the germplasm, or whatever name we may give the substance carrying Heredity, but comes from without the chemical processes which accompany life, and are the outward manifestations of it. And if we do that, we must go a step further, namely, if we admit that the cell has a memory, it must have a soul, that is a psyche, because memory is not a substance but an idea, or mental conception; and an idea, or mental conception is not formed by matter. Then this soul which forms the idea which induces the proper assortation of chromosomes in the developing germ cell is the driving force in our life, and is the cause of the ascent of man; and as each cell of our body is really a living entity with an intelligence of its own, so is our individual intelligence formed of the sum of cell intelligences. But so far as the intelligence of each cell is removed from the intelligence of the whole individual, so far are we removed from that intelligence which would enable us to give a satisfactory answer to all the "whys" which beset us on every side. But I am firmly convinced, that the development of creation will not cease until it has reached that point.

NOTES ON SOME INSECTS FROM ROSEWOOD.

By R. Illidge.

The insect life of the Rosewood district, visited by us on May Day last (3-5th May, 1913), was chiefly notable for the great variety of larval forms, mostly those of *Heterocera.* Prominent amongst them was the handsome caterpillar of *Antheraea simplex,* which was found in all stages; some just emerged from the ovum, others spinning cocoons, of which quite a hundred were brought away, chiefly for the purpose of noting variation in colour and markings (if any) in the imagines. Preying on the larvae of *Antheraea simplex* were found a mantis (*Pseudo mantis,* sp.). On the way to The Bluff, a specimen of *Rhodogastria serica,* Megr. (Hypsidae) was obtained, a species of extreme rarity about Brisbane.

Antheraea simplex.—Larvae, velvety black; tubercles orange red; markings bright yellow green. A waved band connecting the lower lateral line of tubercles; a narrower less waved somewhat broken band connecting the median line of tubercles, and a still more broken band, the dorsal line of tubercles; the dorsal and median lines of tubercles are also connected by straight transverse lines; the setae of tubercles yellowish white; spiracles pale orange; head and anal segment black.

Butterflies were quite abundant on the sunnyside of the crest of the ridge known as the Bluff, and appended is a list of the species noted. No captures were made, except a specimen of *Una serpentata,* a small species secured to make certain of identity.

Limnas petilia, Stoll.—Many specimens of this widely distributed butterfly were seen, mostly in good condition.

Acræa andromacha, Fabr.—Not plentiful.

Pyrameis itea, Fabr.—A few of this active and pretty butterfly were noted, all in good condition, thus showing very recent emergence from the pupae.

Pyrameis kershawi, McCoy.—Fairly plentiful.

Junonia villida, Fabr.—Common.

Hypolimnas bolina, Linn.—Scarce, both sexes noted.

Ypthima arctous, Fabr.—A few only of this usually very common insect were in evidence.

Hypocysta pseudirius, Butl.—Same remark applies to this.

Danis taygetus, Feld.—Both sexes moderately plentiful.

Zizera labradus, Goat.—Not particularly abundant.

Nacaduba ancyra, Feld.—Both sexes, but somewhat scarce.

Nacaduba berenice, Herr Schff.—Males only noted.

Una serpentata, Herr Schff.—In fair numbers at The Bluff.

Lucia lucanus, Fabr.—Both sexes not uncommon at same locality.

Terias libythea, Fabr.— } Both species rather scarce.
Terias smilax, Don.— }

Elodina angulipennis, Lue.—Abundant.

Elodina parthea, Hew.—Abundant.

Belenois java, Sparr (*Pieris teutonia*, Fabr.)—Not quite as abundant as usual · both males and females exhibited the colours usual to the winter forms of this insect.

Huphina scyllara, McLeay.—This in the usual early winter colours was in fair evidence. All noted were clay coloured on the hind wings, the slate coloured forms of mid-winter had not yet made their appearance, thus showing that the Rosewood species under this name do not differ from those of the Brisbane district as regards seasonal forms.

Appias ega, Boisa.—Male specimens seen only.

Delias nigrina, Fabr.—A few male specimens noted.

Delias nysa, Fabr.—The most abundant of the butterflies seen, the males predominating as usual. They were in good condition, thus showing recent emergence.

Catopsilia, gorgophone, Boisa.—One specimen of this fine species came and settled down not more than four feet from where we were standing at The Bluff.

Catopsilia pomona, Fabr.—Not common.

Papilio anactus, McLeay.—Not common.

Papilio ægeus, Don.—A much wasted male only.

Eurycus cressida, Fabr.—Two or three males only seen.

Hesperidæ were notably absent, the season being over for them, as for many butterflies which I know are to be found in the district. The drought under which the country thereabout was suffering, also militated greatly against an abundant insect life.

ANOSTOSTOMA AUSTRALASIÆ, G. R. GRAY.

By R Illidge.

The great apterous locust known by this name, long recorded as from Eastern Australia, but never common, and of which the most meagre information is obtainable, absolutely nothing being known of its habits, was captured by us on Easter Monday, at Goodna, under a piece of bark lying loosely on the damp ground of the scrub, just where we were getting lunch. The swollen head and enormous toothed mandibles of the creature give it a most repellent appearance. Another feature of the insect is the curious form of the labrum, and, in fact, the large size of all the oral organs is especially noticeable. That it lives in holes in the ground, as stated by Froggatt, I rather doubt. It has no fossorial claws like the mole-crickets, yet it is quite possible

that it may use its great three-toothed mandibles for the purpose of cutting the soil and the labrum for shovelling it out. However, close investigation of the insect would be necessary for proof of this supposition, which, if true, would certainly disclose the uses of these great organs.

There are several other closely allied insects of the Locustidæ found about Brisbane, some of them of great size, possessed of wings of fairly ample proportions, and able to fly well. They are nocturnal in habits, living during the day in the deserted tunnels of the wood-boring moths and beetles. These the females usually enlarge with their mandibles, if not big enough, and then seal up the entrance so as to be undisturbed when laying their eggs. When disturbed they are very militant, and can bite fiercely with their mandibles. I am also inclined to the belief that they are carnivorous in their tastes and scruple not to devour the tenants of the tunnels when they find them occupied.

As regards the size of *Anostostoma*, there are many of the Locustidæ (winged forms) which are at first sight far larger. For instance, I have had specimens of the great New Guinea *Eumegalodon* quite six in. in expanse of wings, but the body is comparatively small. Were *Anostostoma* a winged form, they would expand to at least 9 inches to be able to carry the creature any distance in flight.

Again, in New Zealand there are some large apterous insects, with very lengthy antennæ, known technically as *Deinacrida*, of which several species are recognised; one, the *Deinacrida heteracantha*, "Wetapunga" of the Maories, is common, and about 2½ inches or even more in length.

ODD NOTES ON SOME INSECTS FROM THE GARDEN.

By R. Illidge.

Asota (*Hypsa*) *plagiota*.—The examples exhibited are rare varieties of this common insect lately bred out. We hope to be able shortly to conclusively prove that this species and *A. iodanica* are but varieties of one species.

Nyctemera secundiana.—The larvae of this moth have been playing havoc with Cineraria.

Eutelia jocosatrix.—The moth (an introduced insect, by the way) known by this name, is proving rather destructive to the mango tree, the young shoots of which are in many cases stripped quite bare of leaves by the pale green and speckled larvae.

Brunia replana.—A pretty lithosiad moth—not destructive—larvae feeds on lichens.

Anthela acuta.—These are dark female forms of a rather common moth, the hairy caterpillars of which feed on many plants, but more particularly the Eucalypti. They do not occur in numbers sufficient to be called destructive, however.

NOTES ON THE LIFE HISTORY OF THE MOTH, *ANTHERÆA EUCALYPTI.*

By E. H. Shearwin.

These moths, some of the larvae of which I showed at our last meeting, have emerged from the pupa state during the last two weeks. A short time before the larvae build their cocoons they become very sluggish in their movements. After selecting a place that suits them, they exude a quantity of brownish-looking liquid mixed with excreta, which reduces their size considerably. At this stage they lose all their beautiful colours. It takes about 36 hours to build the cocoon. These cocoons are of a rather interesting structure. At the base, where they are attached to the twigs, may be noticed a row of small holes on each side. These holes do not communicate directly with the inside of the cocoon, but to a chamber, which in turn communicates to the inside of the cocoon by means of very minute holes. A small ant might get into the first chamber, but would have to be microscopic to get into the cocoon. I have cut a section of one of the cocoons, which shows the two chambers plainly. It is a very interesting sight to watch the moths cutting their way out. Near the base of each of the wings are beak-like attachments (I have bared the wings in one of the specimens to show these, they can be seen distinctly with a pocket lens). These are used for loosening the silk and cutting the way out. I think the moths must moisten the cocoon with some liquid before commencing operations, as they are very hard. It takes about one hour's vigorous work before they cut their way out. On emerging the moths crawl to a twig where their body can hang downwards. This appears necessary for the proper development of the wings. At this stage the wings look like a piece of crumpled brown paper. In about half-an-hour the wings are fully expanded, but are kept together like a butterfly's for a time and till near dark, when they are spread out in the ordinary moth-like fashion. They emerge from the cocoon between the hours of three and five in the afternoon. It is very rare for them to emerge outside the hours mentioned.

A considerable variation in the colours may be noticed. Some naturalists say that this variation is caused by differences of temperature, light, or the want of it, or different food plants.

I might say that my specimens were bred under exactly similar conditions throughout, so that the above theories scarcely hold good as far as these specimens are concerned. The eggs were laid on November 15th, 1912, and hatched out on the 25th of the same month. All were pupated on December 24th; Imagos emerged between February 6th and 26th, 1913. This makes two broods for the season.

EXCURSION TO CURRUMBIN.

Report on Pond and Shore Life.—*By W. R. Colledge.*

The little Currumbin rocks at low tide, furnished an interesting field for the naturalist. Various sea plants formed miniature gardens in the rock pools. Purple and grey mottled anemones lay in the fissures, some with extended tentacles fully justifying their popular title of "Sea Flowers." Small fish flitted among the green fronds of the Ulva, while variegated crabs sought to shroud themselves beneath the leaves of the Peacock's tail. One crustacean was in the grip of a young octopus; seven prisoning bands encircled him, while the eighth tentacle anchored the creature to the rock. The poor crab's case was hopeless until a member of the club detached the limb, when the octopus, deeming discretion the better part of valour, renounced his prey, and lashing the water disappeared beneath a dark rock shelf, while the crab scudded away to a safe shelter. Several young Sea Urchins (*Echinodermatæ*) Sea Stars (*Asteroidæ*), and the *Ophiuroidæ*, or Brittle Stars, furnished delicate but fragile specimens of lovely marine architecture. Some of the Gephyrean worms, *Genus Sepunculus*, and a little crustacean of the Idotheida family were secured. Families of Ascidians, left dry by the retreating waves, spurted jets of water across to their comrades. Living Cowries, Tritons and Patellas clung to the steep rock faces, and some were whitened with the contorted tubes of serpulas, whose occupants had long since passed away.

Not many fresh water pools were seen, and only about a dozen Rotifers were observed.

ASHGROVE EXCURSION, OCTOBER 12th, 1912.

Report on Pond Life.—*By W. R. Colledge.*

On our excursion to Ashgrove we found in the bed of the creek, notwithstanding the dry condition of the neighbourhood, good water holes containing fair quantities of clear water, and, especially near the edges, good clusters of growing Nitella. A minute green alga was also noticed, with filaments whose cells were about twice as long as they were broad—probably *Microspora floccosa* Of Desmids *Closteria lunula* and *Micrasterias denticulata* were seen, also specimens of the sun animalcule, *Actinophrys eichornii*.

Stentor polymorphus were swimming about among dense colonies of stalked vorticella.

Eight species of Rotifers were recognised:—*Syncheta tremula, Euchlanis triquetra, Dinocharis tetractis, Rotifer vulgaris, Mastigocerca elongata, Cœlopus porcellus, Furcularia longiseta* and *Copias cerberis.*

The small entomostracan resembling *Cyclops quadricornis*, but less in size, *Canthocamptus minutus* and *Diaptomas castor* were also in evidence. The larva of a small dipterous fly, the "Tanipus," were fairly numerous, and a bag of eggs embedded in gelatinous material secured. Beneath the half submerged stones, great numbers of the larva of *Gyrinus natator*, the Whirligig Beetle, were hiding. Their sides were thickly clothed with respiratory filaments, which, as they wavered in the water, reminded us of the grass petticoats worn by the women of New Guinea. Two varieties of mosquitoes paid us visits—*Culex Vigillax*, the black bush mosquito, and *C. Annulirostris*, and in the half-hidden detached pools at the side, the larva of the latter were found. These are distinguished by their long respiratory syphon.

SPECIAL NOTE

The financial year of the Club commences on the 1st January, and the Hon. Secretary will be glad to receive subscriptions for 1914 as early as possible. Members whose subscriptions are in arrears are requested to forward same without delay.

EXCURSIONS FOR 1914.

Suggestions of localities for excursions are earnestly requested and should be sent to the Hon. Secretary as soon as possible.

C. T. White,
Hon. Secretary and Treasurer,
c/o Department of Agriculture and Stock,
Brisbane.

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PROCEEDINGS.

ANNUAL MEETING, 30th JANUARY, 1913.

Chairman: R. Hulsen. Attendance, 26.

Annual Report: The report of the Committee for 1912 was read and adopted.

Presidential Address: The retiring President delivered an address on "Heredity" (vide Transactions, page 267).

Office Bearers: The election of office-bearers for 1913 resulted as follows:—*President,* H. A. Longman, *Vice-President,* R. Illidge; *Committee,* Miss M. Garraway, Miss K. Sheldon, W. R. Colledge, F. Burtt, H. Hacker, and R. L. Higgins; *Hon. Secretary:* C. T. White; *Hon. Excursion Secretary,* Professor S. B. J. Skertchly; *Hon. Lanternist,* W. M. Tanner.

In October, Mr. R. Illidge resigned, and his position was taken by Mr. W. R. Colledge, and the vacancy on the committee thus made filled by Miss Freda Bage, M.Sc.

EVENING MEETING, 27th FEBRUARY, 1913.

Chairman: H. A. Longman. Attendance 22.

Members elected: W. Byram, F. A. English.

Exhibits: Mr. E. H. Shearwin showed a series of the moth *Antheræa Eucalypti,* and read notes on the life history of same (vide Transactions, p. 277). By Mrs. Longman—specimen of the wood-boring moth (*Xyleutes liturata*). By W. M. Tanner—Immature female of a rather rare Phasmid. By R. Higgins—Specimens of *Dictyophora multicolor*—one of the Phalloids or Stinkhorn fungi. Botanical specimens were exhibited (1) from the Blue Mountains and Port Jackson, by Miss H. Clark; (2) from Stanthorpe, by Major J. R. Sankey; and (3) from Clermont, by Mr. H. A. Longman; notes on these collections were read by Mr. C. T. White.